

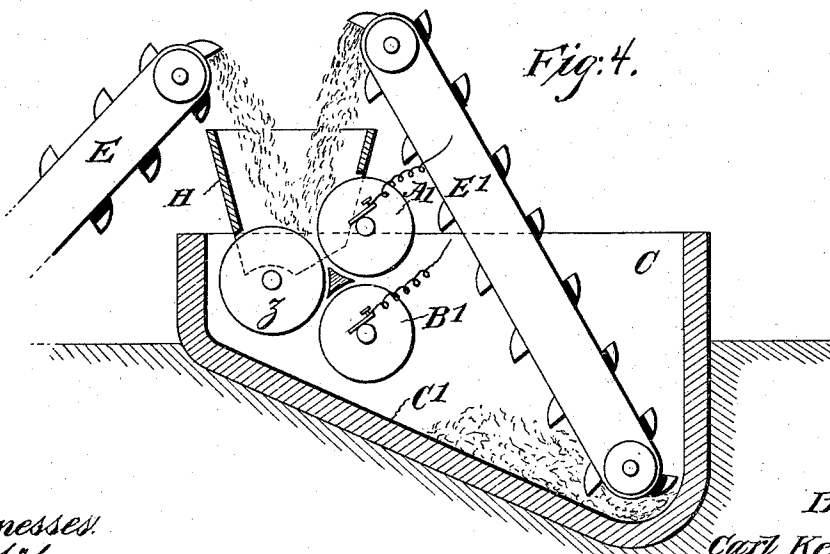
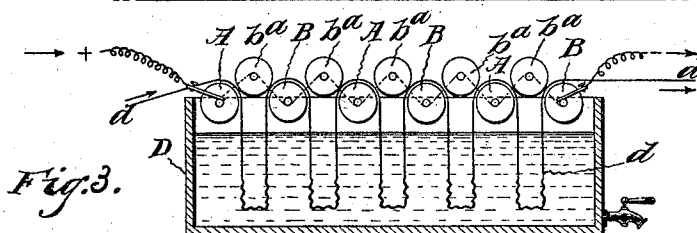
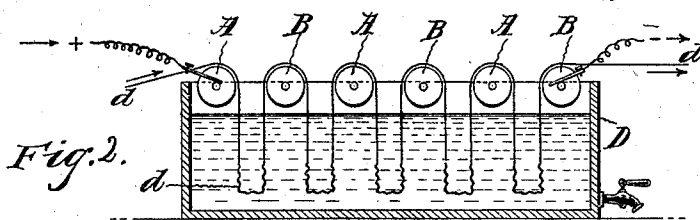
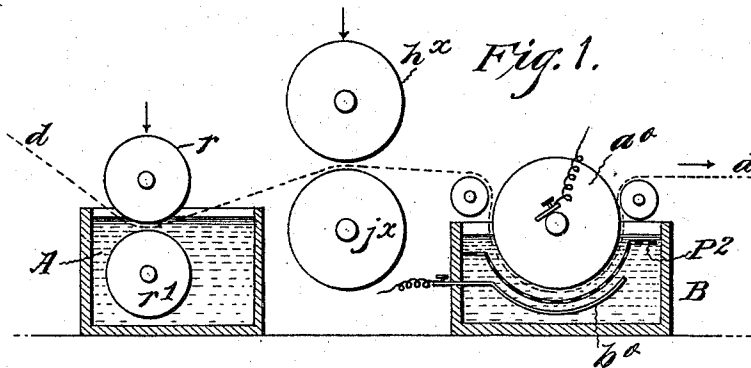
(No Model.)

C. KELLNER.

APPARATUS FOR BLEACHING FIBROUS MATERIALS.

No. 579,236.

Patented Mar. 23, 1897.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

CARL KELLNER, OF VIENNA, AUSTRIA-HUNGARY.

APPARATUS FOR BLEACHING FIBROUS MATERIALS.

SPECIFICATION forming part of Letters Patent No. 579,236, dated March 23, 1897.

Application filed February 1, 1892. Serial No. 419,928. (No model.) Patented in England April 1, 1890, No. 5,054; in France April 1, 1890, No. 204,735; in Sweden June 23, 1890, No. 3,112; in Norway June 24, 1890, No. 2,093; in Germany July 12, 1890, No. 57,619, and in Austria-Hungary December 10, 1890, No. 39,719 and No. 64,567.

To all whom it may concern:

Be it known that I, CARL KELLNER, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Apparatus for Bleaching Fibrous Material by the Aid of Electricity, (for which I have obtained Letters Patent in the following countries, to wit: Austria-Hungary, No. 39,719 and No. 64,567, dated December 10, 1890; Germany, No. 57,619, dated July 12, 1890; France, No. 204,735, dated April 1, 1890; England, No. 5,054, dated April 1, 1890; Sweden, No. 3,112, dated June 23, 1890, and Norway, No. 2,093, dated June 24, 1890;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention has relation to the art of bleaching fibrous materials, either in a loose or in a web form, by the action of bleaching agents in their nascent state, that is to say, by bleaching agents acting upon the fibrous materials immediately after being formed by the electrolytic decomposition of a suitable solution of a salt of an alkali metal, as a solution of sodium chlorid, and for the purposes of description it will be assumed that the ions resulting from the electric decomposition of a sodium-chlorid solution are made available as bleaching agents.

In the accompanying drawings, Figures 1, 2, and 3 are more or less diagrammatic sectional views of apparatus, showing various arrangements of electrodes; and Fig. 4 is a vertical cross-sectional view of an apparatus particularly designed for bleaching raw or loose fibrous materials.

The arrangement and form of the electrodes can be varied in accordance with the nature of the material to be bleached. In general they are cylindrical in cross-section and revoluble, yet for certain purposes a fixed electrode may be used in conjunction with a rev-

oluble cylindrical electrode, as will hereinafter appear. The positive electrode will of course be made of a material capable of withstanding the action of the electrolyte and of the ions resulting from the electrolytic decomposition of such electrolyte, and when a sodium-chlorid solution is employed the positive electrode can be made of carbon or of platinized metal and the negative electrode of iron.

Referring to the drawings, in Fig. 1 I have shown an apparatus more especially designed for the bleaching of spun goods, woven fabrics, or hard-pressed materials of cellulose, in which the material is first passed between two feed-rolls r and r' , revolving in an impregnating or saturating tank A, containing sodium chlorid, thence between squeezing-rolls $h \times j \times$, and finally to the bleaching-vat B, which also contains a solution of sodium chlorid, and in which is mounted a revoluble cylindrical positive electrode a^0 , the negative electrode b^0 being here formed of a segmental or concavo-convex plate arranged within the vat in proximity to the electrode a^0 , a foraminous diaphragm P^2 being interposed between the two electrodes that divides the vat into two chambers. In this construction of apparatus the material to be bleached is acted upon by chlorin only, which is set free in vessel B.

It is not absolutely necessary that the electrodes should be juxtaposed. There may be a considerable space between them; nor is it absolutely necessary that the electrodes should be wholly or partially immersed in the electrolyte, because by spacing them as set forth it is possible to keep the web of material to be bleached constantly saturated with the electrolyte by causing it to pass from an electrode into the electrolyte and then to the next electrode, and so on alternately, the electric current following a zigzag course, or substantially so, as shown in Figs. 2 and 3. As will readily be seen from an inspection of Fig. 2, the current sent to the first or left-hand positive electrode A will be conducted to a point where the web of material d enters the electrolyte to a point where said web issues from said electrolyte to the next nega-

tive electrode B, and so on alternately from one pair of electrodes to another, and if the electrolyte contains a chlorin compound of a metal of the alkalies the nascent chlorin will act on the fibrous web directly to bleach the same. There is, however, in this arrangement of electrodes considerable resistance to be overcome, which may be avoided by grouping the electrodes as shown in Fig. 3, where an additional electrode b^a is arranged between a pair of such, the current also taking the zigzag course shown in dotted lines, so that the material d will be immersed in the electrolyte as it passes from one electrode to another, while undue resistance due to the distance between the electrodes will be avoided. This latter arrangement of the electrodes presents, however, a further and very important advantage in that the surfaces of the material d are alternately exposed to the positive and negative electrodes and to immersion in the electrolyte, as will be readily seen from an inspection of Fig. 3.

In Fig. 4 I have shown an apparatus more especially designed for bleaching loose fibers, the bleaching and electrolytic vat C being of masonry and having an inclined bottom C'. At the point of least depth of the vat are mounted a pair of cylindrical revoluble electrodes A' and B' and a feed-roll z , of wood, and above the same is arranged a hopper H, to which the fibers are fed by any suitable conveyer E and returned to said hopper after having passed between the electrodes by a second conveyer E', the lower end of which is arranged at the point of greatest depth of the vat C.

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

1. In an apparatus for bleaching fibrous materials, the combination with a vessel for containing a suitable electrolyte, of electrodes arranged relatively to one another to cause the electric current to follow a zigzag course, and means for bringing the material saturated with the electrolyte into contact with said electrodes, for the purpose set forth.

2. In an apparatus for bleaching fibrous ma-

terials, the combination with a vessel for containing a suitable electrolyte, of a positive and negative electrode, an intermediate electrode coöperating therewith, and means for passing the material to be bleached first into contact with the positive and intermediate electrode, then into contact with said intermediate electrode and the negative electrode, for the purpose set forth.

3. In an apparatus for bleaching fibrous materials, the combination with a vessel for containing a suitable electrolyte, of a positive and negative electrode, and an intermediate electrode coöperating therewith, said electrodes out of immediate contact with the electrolyte, said positive and negative electrodes being distant from each other whereby the material to be bleached may first be brought into contact with the positive and intervening coöperating electrode, then into contact with the electrolyte, and again into contact with said intervening electrode and the negative electrode, for the purpose set forth.

4. In apparatus for bleaching fibrous materials in the web, a series of coöperating cylindrical revoluble electrodes arranged relatively to one another so as to cause the electric current to follow a zigzag course through said electrodes, for the purpose set forth.

5. In apparatus for bleaching fibrous materials in the web, a vessel adapted to contain a suitable electrolyte, a series of cylindrical electrodes mounted and revolving in said vessel above the level of the electrolyte, said electrodes arranged relatively to one another to cause the electric current to take a zigzag course therethrough whereby the web of material is immersed in the electrolyte before it passes between the successive pairs of electrodes, and whereby both sides of the material are acted upon by the bleaching agent formed by the action of the electric current on the impregnating material.

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

CARL KELLNER.

Witnesses:

JULIUS GOLDSCHMIDT,
A. SCHLESSING.