Patented Oct. 19, 1954

2,692,228

UNITED STATES PATENT OFFICE

2,692,228

ELECTROLYTIC RECORDING PAPER

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No Drawing. Application December 29, 1950, Serial No. 203,560

4 Claims. (Cl. 204—2)

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This invention relates to electrolytic recording paper of the type employed in facsimile recorders.

In the facsimile art it is common to pass a modulated electric current through an electrolytic recording paper to produce marks on the paper in accordance with the current. The electrolytic recording paper may be of the types described in Patent No. 2,339,267, issued on January 18, 1944, to John V. L. Hogan et al., and Patent No. 2,358,839, issued on September 26, 1944, to Edgar R. Wagner.

The recording process may be performed by feeding the recording paper between a stationary linear or blade electrode and a cooperating rotating helical electrode. At any instant of time, the electric current passes through the recording paper at the moving point where the helical electrode crosses the linear electrode. In this manner, the recording spot is made to move from left to right across the recording sheet in lines successively displaced from the top to the bottom of the sheet until the entire area is covered. This may be termed spot-by-spot and line-by-line recording.

In the process of scanning electrolytic recording paper in a recorder having linear and helical recording electrodes, it has been found that paper fibers (which are impregnated with chemicals) become dislodged from the recording sheet and adhere to the helical electrode. After a short period of operation, the fibers and chemicals collect on the helical electrode to such an extent as to partially insulate the electrode from the paper thereby seriously impairing the recording process. This effect is commonly termed "blocking."

To prevent blocking in helix and blade recorders, it has been necessary to provide a cleaning brush disposed to engage the helical electrode as it rotates. A recorder with such a cleaning brush is shown in Fig. 2 of Patent No. 2,480,890, issued September 6, 1949, to William H. Tribble.

The use of a brush for keeping the helical electrode clean entails the disadvantages of added initial and maintenance costs in the recorder. A serious factor is that the cleaning brush acts as a drag on the rotation of the helical electrode and thereby necessitates the use of an unduly large driving motor therefor. Consequently it is an object of this invention to provide a recording paper which does not cause blocking and therefore avoids the need for and disadvantages of a cleaning brush for the helical electrode.

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It is another object of this invention to provide an electrolytic recording medium which allows of clearer and more vivid recordings than have heretofore been possible.

It is a further object to provide an electrolytic recording medium which is not inclined to discolor for a long period after being recorded upon.

It is a further object to provide a recording medium which is free of the tendency of a recorded mark to "bleed."

These and other objects will be apparent to those skilled in the art from the detailed description of the invention.

Paper consists of matted fibers and it is electrically non-conductive. The recording process requires the passage of current through the paper and therefore the paper must be made electro-conductive as by impregnation with aqueous chemical solutions which impart electrical conductivity to the sheet. The impregnating solution must also contain a marking compound which changes color on the passage therethrough of an electric current.

It has been found that, in the manufacture of recording paper, the addition to the impregnant through which the paper stock is passed of about 5 per cent by weight of an organic water-soluble wax-like solid results in a recording paper having extraordinary characteristics. Firstly, the resulting recording paper, for reasons not fully understood at the present time, does not cause blocking of the helical electrode when used in a recorder. As a result, a helix brush is not needed, and the construction of the helix drum can be simplified in that the helix wire need not be elevated from the surface of the drum to the extent required in the past.

Secondly, recordings made on the paper have greater contrast than those previously obtainable; the black portions being blacker and the white portions being just as white. A reason for this improvement in the quality of recording may be that the water-soluble wax-like solid in some way restricts the color-forming chemical change to the surface of the recording paper where it is visible rather than allowing the mark to be distributed through the paper. This desirable result is achieved without any detectable reduction in the electrical conductivity of the recording paper.

Thirdly, the addition of a water-soluble wax-like solid retards discoloration of the record-bearing medium which otherwise results from exposure to the ageing effects of air and sunlight over a long period of time. This increased stability of the recording paper may be due to

a partial sealing of the chemicals in the paper from the air and/or a mechanical insulation of chemical particles from each other. Insulating action may also account for the fact that marks recorded on the paper do not spread, an effect commonly termed "bleeding."

Water-soluble wax-like solids which have been found suitable for inclusion in the impregnant for electrolytic recording papers are polyethylene glycols having molecular weights of 1000 or higher. These solids are available commercially under the trade name "Carbowax." The term "water-soluble," as used herein, in addition embraces the quality of being readily dispersible or colloidal in water.

As a particular example, an electrolytic recording paper may be made by impregnating parchment paper with the following solution:

Water	cubic centimeters	100
Catechol	grams	5
Potassium nitrate	do	10
Oxalic acid	do	0.5
Polyethylene glycol 1540	do	5

In the above solution, catechol is a lake-forming marking compound, potassium nitrate is an electrolyte, oxalic acid is an acidifier, and polyethylene glycol is a water-soluble wax-like solid.

A convenient method of impregnation is to pass the sheet through a bath made according to the above formula. The solution is allowed to distribute itself evenly throughout the paper. After impregnation of the paper, excess impregnant should be removed, as for example by passing the paper through pressure rolls, so that when used for recording the paper has about 40 per cent moisture by weight.

While only one example of the invention has been given, its many possible modifications will be evident to those skilled in the art within the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. An electrolytic recording material for recording by means of cooperating electrodes, and having an anti-blocking characteristic, comprising a porous support impregnated with an aqueous solution of a lake-forming compound, an electrolyte, and a water soluble wax-like solid in sufficient quantity to prevent blocking of the electrodes during recording, and wherein said solid includes polyethylene glycol.

2. An electrolytic recording paper for recording by means of cooperating electrodes, and having an anti-blocking characteristic, comprising a porous support impregnated with an aqueous solution of catechol, potassium nitrate, oxalic acid, and a water soluble wax-like solid in sufficient quantity to prevent blocking of said electrodes during recording, and wherein said solid includes polyethylene glycol.

3. An electrolytic recording paper for recording by means of cooperating electrodes, and having an anti-blocking characteristic, comprising a porous support impregnated with an aqueous solution consisting essentially, in parts by relative weight, of catechol 5, potassium nitrate 10, oxalic acid 0.5 and a water soluble wax-like solid in sufficient quantity to prevent blocking of said electrodes during recording, and wherein said solid includes polyethylene glycol.

4. An electrolytic recording paper, comprising a porous support impregnated with an aqueous solution containing catechol, an electrolyte, and polyethylene glycol having a relative molecular weight of at least 1000 in sufficient quantity to prevent blocking during recording.

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