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R. SERRELL

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ELECTRICAL RECORDING

Filed June 18, 1930

Fig. 1.

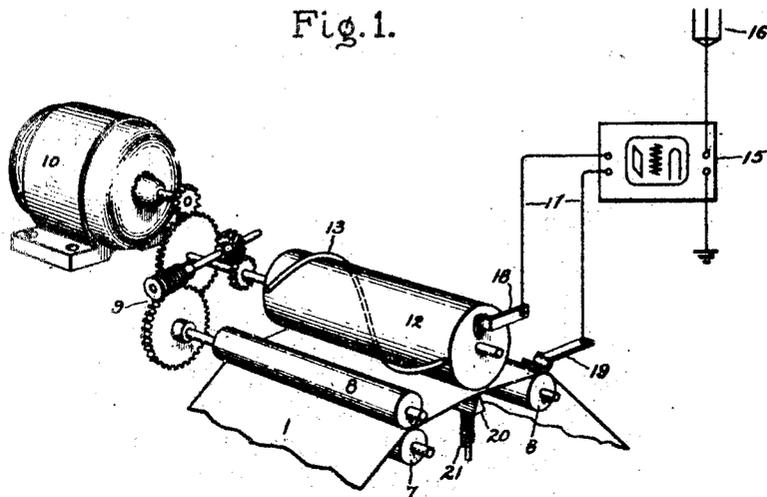


Fig. 2.

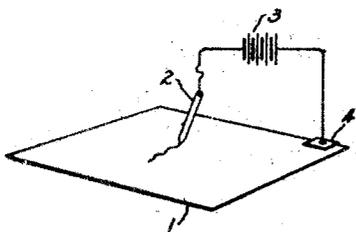
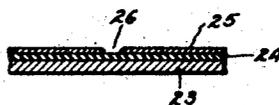


Fig. 3.



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## UNITED STATES PATENT OFFICE

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## ELECTRICAL RECORDING

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My invention relates to the recording of electric current or impulses and particularly to the electrical recording of a picture or message transmitted from a distant point.

It is the object of my invention to provide an improved method and means for recording electric current or impulses which is simple, reliable, inexpensive and results in a record which is clear and distinct in appearance and permanent in character.

My invention will be better understood from the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings Fig. 1 represents apparatus comprising one embodiment of my invention; Fig. 2 is an explanatory diagram; and Fig. 3 is a cross section through one form of paper upon which a record is made.

My invention will perhaps best be understood by first considering the diagram comprising Fig. 2; in that figure, 1 represents a sheet of paper which on its upper side has a very thin metallic coating. Various metals have been successfully used for the coating, such for example as tin, aluminum, nickel, etc., good results having been obtained with a pure tin coating of approximately 0.00025" thick. I prefer, however, to use a metal coating having a thickness much less than that amount. A stylus 2 is connected to a suitable source of electric current shown for example as the battery 3 which also connects by means of the contact plate 4 with the metal coating on the paper. As the stylus is moved over the paper in contact with the coating, the metal is vaporized in the path of the current flow between the stylus and the paper, leaving a trace of the movement of the stylus. Instead of moving the stylus in contact with the paper, it may be moved over the paper at a slight distance therefrom in which case a sufficient potential difference must be applied to cause a discharge between the stylus and the paper.

In Fig. 1, I have shown a form of apparatus by which such a metal coated or metallized paper may be used for the automatic reception of a picture or message transmit-

ted electrically from a distant point. In that figure the metal coated paper 1 is in the form of a long strip and is drawn slowly over the rolls 6 and 7. For continuous operation the paper strip may be unwound from a suitable supply roll and arranged to be wound up after passing through the apparatus on another supply roll. Cooperating with roll 7 is the roll 8 which is illustrated as having a geared connection 9 with the driving motor 10, whereby it turns at a relatively slow speed. Between the rolls 6 and 7 is the metallic cylinder 12 which is also geared to the motor 10, the gearing in this case being such that the cylinder is rapidly rotated. On the face of the cylinder is the helical ridge 13 which in the length of the cylinder makes one complete turn. This ridge, it will be noted, corresponds to the stylus 2 of the diagram comprising Fig. 2. In this embodiment of my invention the signals received from the distant station are presumed to be transmitted by radio. For that reason I have shown at 15 a radio receiving apparatus having the antenna 16 and having circuit connections 17 which extend respectively to the brush 18 bearing upon the cylinder 12 and the brush 19 which makes contact with the metal coating on the paper. In order to more sharply define the contact point of the spiral ridge 13 and the metal surface of the paper, I have provided the printing bar 20 which has a sharp edge over which the paper is passed and which is yieldingly pressed by means of the springs 21 against the paper.

In receiving a picture or message the paper is slowly moved over the printing bar 20 while the cylinder 12 rapidly revolves, the speed of the cylinder and the paper being synchronized by suitable means, not shown, with the corresponding parts of the sending apparatus. Each time an impulse is received from the sending station, the resulting current flow between the spiral ridge 13 and the paper at their point of contact, causes a small quantity of the metal forming the coating to be vaporized leaving the paper exposed at the point of vaporization.

Where a metal coating is used which is of light appearance, and the paper also is white or of a light color, I may prefer to give the paper an asphalt coating before covering it with the metal. In Fig. 3, I have shown a cross section greatly enlarged of such a paper. The paper base is here represented at 23, the asphalt covering at 24 and the thin metal covering at 25. At 26 I have shown a point at which the metal covering has been vaporized and removed by the passage of current therethrough.

Various methods may be employed for producing the metal coated paper. For example, a very thin foil may be mounted on black paper with a colorless material or may be mounted on white paper with a black material; molten metal may be projected on black paper by the Schoop process, after which the paper with its coating is rolled down; or the paper may be electro-plated. This process, I believe, is the most expeditious since an alkaline tin solution containing "slowing" products, such as two or three per cent of glue, yields excellent deposits of almost any thickness. It is also possible to plate insulating materials through the conductivity of a temporary backing, such for example as a brass roll. Metallized paper such as described may be used moreover in the klydonograph, good results in recording high tension discharges having been obtained therewith. It may also be used to replace the paper tape of printing telegraphs and to record with a stationary stylus through direct passage of current. In short, metallized paper of this character having proper characteristics of flexibility, thickness, and appearance, may be used in many cases where electrical impulses convey or reproduce graphical material.

I have chosen the particular embodiment described above as illustrative of my invention and it will be apparent that various modifications may be made without departing from the spirit and scope of my invention which modifications I aim to cover by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The method of making a record on paper having a thin metallic coating thereon, which comprises vaporizing the coating by current flow between it and a relatively movable conductor.

2. The method of recording electrical impulses on paper which comprises coating the paper with a thin metallic layer and vaporizing the layer in the path of a current flow in accordance with said impulses between it and a relatively movable conductor.

3. The method of making a paper record of electrical impulses which comprises coating the paper with a thin metallic layer, producing a current flow in accordance with

said impulses between the layer and a stylus sufficient to vaporize the metal and causing relative movement between the paper and the stylus.

4. Apparatus for recording electrical impulses on metal coated paper, comprising means for applying to said paper a current sufficient to vaporize the metal coating thereof at the point of application and varied in accordance with said impulses, and means for producing relative movement between said means and said paper.

5. Apparatus for recording electrical impulses, comprising paper having a thin metallic coating thereon, means for uniformly moving the paper, means for applying to the coating on the paper a current varied in accordance with said impulses and sufficient to vaporize the coating at point of application.

6. Apparatus for recording electrical impulses on paper having a thin metallic coating thereon, comprising means for producing a uniform movement of the paper, means including a movable stylus for applying to said paper a current which varies in accordance with said impulses and which is adapted to vaporize the coating at the point of application thereof, said stylus being constructed to cause said point of application to move in a direction transverse to the movement of the paper.

7. Apparatus for recording electrical impulses on paper having a thin metallic coating thereon comprising means for producing a uniform movement of the paper, a stylus comprising a cylinder having a helical ridge thereon, a printing bar between which and the ridge the paper is caused to pass, means for rotating the cylinder and means for causing a current flow between the coating and the helical ridge in response to the impulses to be recorded sufficient to cause the vaporization of the coating.

In witness whereof I have hereunto set my hand this sixteenth day of June, 1930.

ROBERT SERRELL.