Jan. 10, 1939. C. W. HANSELL 2,143,376

RECORDING SYSTEM

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Fig. 1

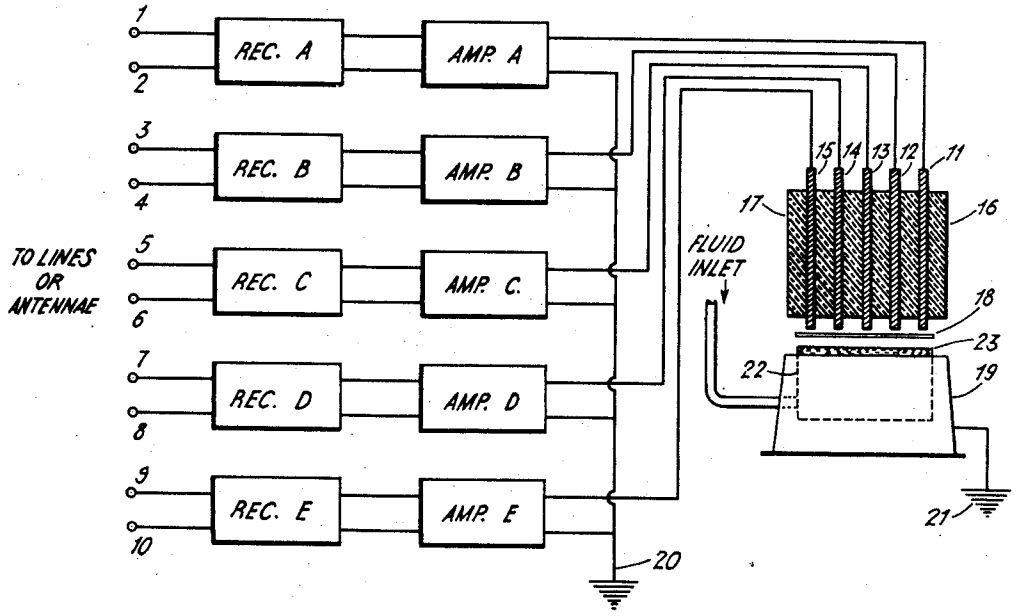
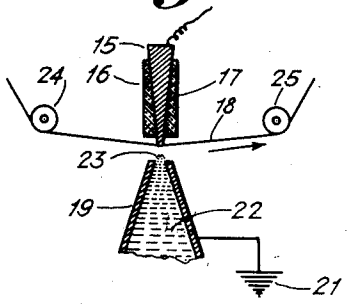



Fig. 2

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## RECORDING SYSTEM

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2 Claims. (Cl. 234—1.5)

This invention relates to a method and apparatus for recording messages, and particularly for recording either facsimile messages or for recording coded messages directly upon a record surface.

It is a particular object of this invention to provide a system for recording messages which will operate at high speeds and which will provide recordings which are immediately visible to the eye, as well as to provide a system for obtaining these results in which there is a substantial minimum of any mechanically moving parts, and particularly a total lack of any mechanically moving parts which would control the actual recording or impression upon the record surface itself. It has been found in practice that the presence of mechanically moving parts prevents to a great extent operating recording systems at extremely high speeds, and also it has been found that systems wherein mechanically moving parts are present as a part of the recording mechanism, require frequent and expensive replacement.

It is also desirable in recording messages to obtain in the first instance a record which is permanent, visible, and which may be obtained without the necessity of later development and washing such as is necessary when recourse is had to a photographic method of recording such messages.

The foregoing, as well as many other objects of the invention are therefore a part of my present invention, and such additional objects as have not herein been stated will naturally suggest themselves to those skilled in the art to which the invention is directed by reading the following specification and claims in connection with the accompanying drawing, wherein Fig. 1 schematically represents one form which my recording system may assume, and wherein Fig. 2 represents a sectional view in a plane perpendicular to the section of the recording instrumentality shown by Fig. 1.

In the production of signal impulses of which it is desired to produce a visible record, any desired system such as is already known in the art, may be used. Such a system may comprise, for example, the ordinary picture transmitting systems such as have been disclosed by R. H. Ranger, and many others. Or the system may comprise a form of device wherein signals representing letters are transmitted, as is done by means of perforated tape type transmitters and the like, making selections through appropriately controlled transmitting channels. The transmission system per se, is a part of the present invention only in so far as it cooperates with the receiving instrumentality.

In the form in which I have shown my recording device I have provided for simultaneously recording a message in five parallel and closely adjacent paths. I have also shown this system as one wherein the operation is controlled over five separate signaling channels which may be either wire or radio connecting links. However, my invention is not in any sense restricted to separate communication channels for each of the recording instrumentalities for I may where desired utilize any suitable type of multiplex transmitter and receiver instrumentalities of which, for example, one form is shown by Letters Patent 1,873,785 and 1,873,786 granted on August 23, 1932, to R. H. Ranger, although this reference is intended only to be illustrative and not limiting since many other well known types of multiplex transmitting and receiving devices are known and useable with equal simplicity.

Assuming for the purpose of illustrating my invention that five separate channels are used (although the invention is not restricted to any specific number of channels and more or less channels of communication can easily be used without any substantial modification of the invention) and that these channels of communication are designated as A through E inclusive, the signals from the respective channels are impressed upon the terminals 1, 2—9, 10 respectively, and passed through the receivers conventionally shown in block diagram by my drawing since these receivers may be of any well-known type which provide the necessary amplification and detection of the received signals. From the output of each receiver the incoming signals are then directed through appropriate amplifier systems A—E, from which the output energy is supplied to the recording point terminals 11, 12—15, and also to the common ground terminal 20. The recording points are preferably constructed in the form of laminated metal bars which are supported within an appropriate holder 16 and electrically insulated one from the other by means of suitable insulating materials 17. The points 11, 12—15 are arranged to project beyond the insulating material 17 so as to terminate substantially adjacent a recording surface 18 arranged to move in the direction shown by the arrow (Fig. 2) and perpendicular to the surface of the paper as shown by Fig. 1.

On the opposite side of the recording surface 18 there is supported a container 19 which is connected with ground at 21. Within the con-

tainer there is contained a fluid material 22, such as ink for example, and the container is preferably kept fully supplied with the recording fluid from an appropriate source (not shown) so that due to surface tension effects a fine line of the recording fluid or ink conventionally indicated at 23 extends beyond the upper opening in the container 19 as shown more particularly by Fig. 2, and this is arranged with a very small clearance from the paper or recording surface. If now a suitable potential of for example several hundred volts is applied to one of the members 11, 12—15 there will be an electrostatic force between this member and the recording fluid or ink 22 which will draw the recording fluid so as to cause it to make contact with the recording surface 18. This contact will persist so long as the potential is maintained between any of the members 11—15 and ground at 21 but will be broken by the movement of the recording surface as it is moved past the ink source as soon as the potential is removed. The gap between the ends of the members 11—15 and the upper surface of the recording fluid may be so great as to be clearly visible and still permit the recording fluid to mark the record surface. If in addition the voltage is such that a spark can be caused to jump through the recording surface to the marking fluid surface 23 at the point of contact of the arc and the fluid, it will cause evaporation and agitation of the recording fluid which will create some free drop which may more easily be drawn to the recording paper.

As a modification of the system herein disclosed instead of providing a recording fluid reservoir adjacent the recording surface, it is also possible to provide a fine jet or spray of the recording fluid which can be arranged to pass near the recording surface. This jet of recording fluid may then be deflected electrostatically to cause markings upon the record surface. From the foregoing it is evident that if for definition purposes five parallel paths of recording are sufficient, that I may then provide for continuously marking a record surface immediately in accordance with any desired type of received signals and provide a record which will be permanent, immediately visible, and produce this recording without relying upon any mechanically moving parts with the exception of the moving record surface 18 as it is drawn over the rollers 24 and 25.

Many other modifications of the invention are of course possible and therefore I believe myself to be entitled to make and use any and all of these modifications which fall fairly within the spirit and scope of the foregoing disclosure as it is defined by the hereinafter appended claims, wherein I claim and desire to secure by Letters Patent the following:

1. In apparatus for recording a plurality of signals simultaneously, a fluid container having one end thereof open and filled with a recording fluid, a plurality of independent stationary electrically conducting elements positioned adjacent the open portion of said fluid container, an electrical signal channel connected with each stationary electrical conducting element, an electrical connection between the container and the plurality of signal channels, and a recording surface interposed between the plurality of stationary electrical conducting elements and the fluid within said container so that during periods when electrical energy is applied to the independent stationary electrical conducting elements the recording surface is marked by the fluid within the container.

2. In message recording apparatus a plurality of stationary recording points, means for independently energizing the plurality of recording points, a record surface positioned adjacent the several independent recording points, and means for moving the record surface continuously relative to said points, and an open-ended vessel containing a recording fluid positioned adjacent the recording surface and on the opposite side thereof from said recording points whereby said fluid is adapted to mark the recording surface during time periods when predetermined signal strength energy is applied to the several recording points.

CLARENCE W. HANSELL.