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R. E. MATHES

2,404,975

RECORDING STYLUS

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Fig. 1.

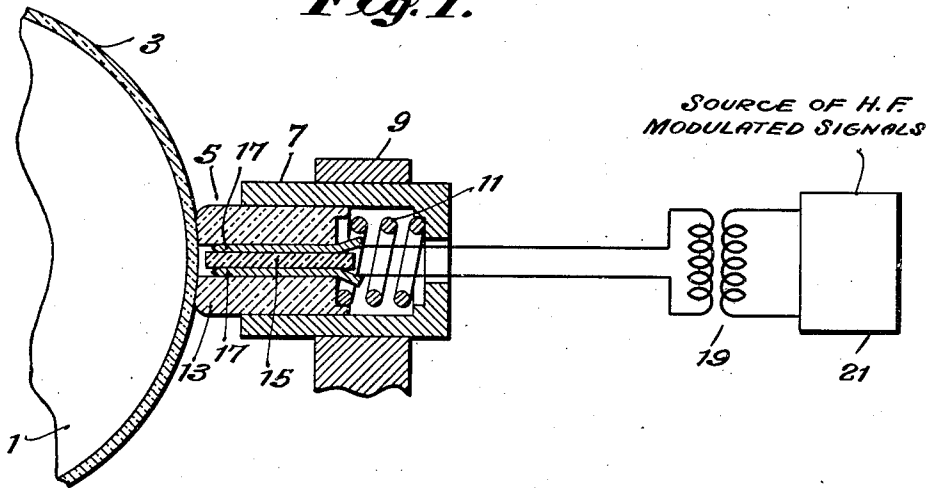


Fig. 2.

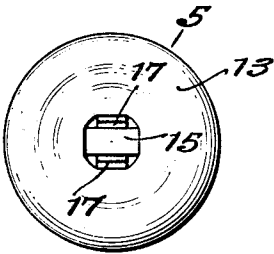
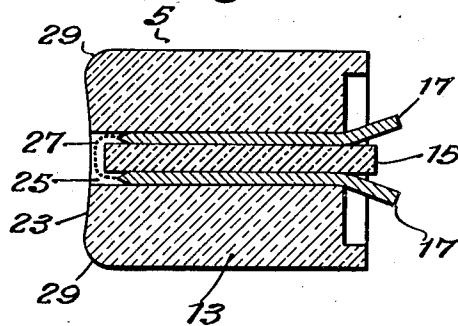


Fig. 3.



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RECORDING STYLUS

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3 Claims. (Cl. 234—64)

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This invention relates to recording, and more particularly to recording styli useful in facsimile systems for recording on pyro sensitive paper.

It has been suggested in the prior art to record facsimile transmissions by utilizing pyro papers or photographic papers by producing a spark between the recording stylus and the metal drum upon which the recording paper is carried. Such systems have suffered from the vital defect of an inability to control the spark path between the recording stylus and the drum, so that diffusion, with the resulting lack in detail, is produced. Moreover, the potentials required to produce the spark through the paper have been excessive. In addition, the abrasive action on the stylus changes the contour of the stylus by wear, so that with use the breakdown potential must be increased. The difficulty of keeping dirt from under the stylus in the form of minute dust particles has also contributed to faulty recording, so that such systems of recording have been discarded.

There is also proposed and used a corona discharge in conjunction with slow speed, color blind photographic emulsions. While this system has afforded better control of the recording area, that is to say, restricting the blackening of the emulsion to the area directly under the recording stylus, it nevertheless was accompanied by some diffusion around the recorded area, since the ultra-violet light was not confined to the immediate area under the recording stylus. The system, moreover, had the objectionable feature of requiring photographic developing and fixing following the recording of the facsimile message.

My invention overcomes all of these defects, and provides a new and more useful stylus for recording in that I not only provide a recording which obviates photographic processing, but also provide a much better control of the recorded elemental area by eliminating diffusion, and at the same time enable exceedingly high speed recordings to be made.

The improvements brought about by my invention are achieved by mounting two electrodes separated by a suitable insulator in an insulating support member, with the points of the electrodes below the surface of the support member, so as to provide a small recessed chamber in which the spark is produced. The insulating member bears directly upon the recording sheet and may be chosen to be a glass which has substantially zero transmission for ultra-violet light, where ultra-violet-pyro paper is used. As a result, only the area corresponding to the cross-

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section of the recessed portions is effective in recording so that complete control of the recorded area is afforded. The support member is held under spring pressure in contact with the recording surface of the paper, so that bulges of the paper do not interfere with proper recording. At the same time, due to the relatively large area and the spring pressure, minute particles become imbedded in the paper and do not change the distance between the recording chamber and the surface of the paper. In addition, the recording chamber itself is substantially sealed off from the atmosphere and convection currents, so that there is some residual ionized gas within the recessed portion which helps to insure uniform and easy breakdown of the gap between the electrodes. The electrodes, therefore, because of high heat concentration and high ultra-violet radiation can be used either with pyro papers of the kind described in the Bicknell and Ranger Patent 1,844,199, or with the Eastman ultra-violet paper which is developed by heat. This latter paper is not to be confused with those ultra-violet papers requiring photographic development.

The paper referred to, as is well known, is one which is sensitized by ultra-violet radiations and is thereafter developed by merely passing the paper over a hot plate or running a moderately warm iron over the paper. When my new recording stylus is used with such Eastman paper, it will be readily apparent that by choosing a glass or other insulating material for supporting the electrodes which does not transmit ultra-violet light, but rather absorbs it, the areas adjacent to the area being recorded will not receive any ultra-violet radiations and consequently will not provide a diffused area around the recorded elemental area.

It will thus be appreciated that the main object of my invention is to provide an improved recording stylus.

Another object of my invention is to provide a recording stylus which can be used with ultra-violet sensitive and pyro sensitive papers, and furnish improved recordings therewith.

Another object of my invention is to provide an improved stylus which utilizes the spectral absorption characteristic of glass to restrict the area of the record surface sensitized during the recording process.

Other objects of my invention become apparent upon reading the following detailed description, together with the drawing.

In the drawing,

Figure 1 shows schematically my improved

form of stylus together with the elements of a recording system;

Figure 2 shows in elevation the recording end of the stylus shown in Figure 1; while

Figure 3 shows a cross-sectional view of the stylus taken across the plane A—A.

Turning now to Figure 1, I have shown a portion of a drum 1 of a facsimile machine around which is wrapped the pyro sensitive paper 3. The stylus 5 is in contact with the paper 3 and is held in contact by the spring 11 within the stylus holder 7, the stylus 5 having an easy sliding fit within the holder 7. The holder 7 is suitably clamped to a lead screw by the clamp 9, which may be of the conventional form well known in the art. The stylus comprising the glass member 13 may take the form of a hollow cylinder within which two pointed electrodes 17 are wedged apart by a bar of suitable insulating material 15, which, for example, may be mica. Leads from the two electrodes 17 are connected to a transformer 19, which in turn is fed with high frequency modulated signals from a source 21, and may include the facsimile signal receiver. The potential supplied across the electrodes is sufficient to break down the gap between the electrodes to produce a spark, and the spark, depending upon the intensity of the potential supplied by the source, will thereafter affect the pyro sensitive paper substantially proportional to the signals. Consequently, the record will show light and dark elemental areas which are related to the signals.

Turning now to Figure 2, there is shown in elevation in somewhat more detail, the structure of the stylus. The hollow insulating cylinder 13 has within its hollow section the two pointed electrodes 17, which are separated and wedged against the internal wall of the cylinder by the insulator 15. The insulator 15 and the two electrodes are set below the bearing surface of the cylinder, as is shown in Figure 3.

In Figure 3, it will be observed that the identifying numerals which are the same as those of Figure 2, relate to the same portions. It will be observed further that the insulator 15 projects beyond the pointed electrodes 17 so that the spark path 27, shown by dotted lines, is over the insulator 15 but within the recessed chamber 25 formed by the electrodes and the insulator filling the internal bore of the cylinder. The face 23 may be ground concavely to have substantially the same radius as that of the drum carrying the paper, with the corners 29 rounded in order to prevent excessive pressure at the edge being built up on the paper when the stylus is held in contact therewith. It will be appreciated that the width of the electrodes 17 will have a dimension substantially that equal to the line advance used in the recorder so that adjacent lines will touch without overlapping.

It will also be appreciated that while for purposes of illustration I have shown a cylindrical bore for the support member 13, the bore may also be a square hole and, moreover, it is not necessary to use a cylindrical support member, but the cross-sectional area may be rectangular as well.

It will further be appreciated that where the stylus is to be used with ultra-violet-heat-sensitive paper, the support insulating member may be made of a suitable ultra-violet light absorbing glass, such as Jena glass RG-2. Alternatively, of course, the support member may be made of any suitable insulating material such as lava, "Isolantite," or any other material which has high breakdown voltage characteristics. Glass, however, has some advantages in fabricating the recording stylus, since by use of suitable metal for the electrodes, such as are well known in the art, the coefficients of expansions can be matched. Under these conditions it is essential to insure that the support member absorbs any radiations which would affect the areas adjacent the desired elemental area being recorded.

From the above description, it, of course, will be apparent that many and varied modifications of the invention may be made without departing from the general principles described and outlined hereinabove, and I, therefore, believe myself to be entitled to make any and all of these modifications such as would suggest themselves to those skilled in the art to which the invention relates, provided, of course, that such modifications and changes fall fairly within the spirit and scope of the invention as set forth in the hereinafter appended claims.

Having now described my invention, what I claim is:

1. A recording stylus comprising a support member, a pair of sparking electrodes imbedded within said support member with the sparking areas of said electrodes below the surface of said support member and exposed to the atmosphere.

2. A recording stylus comprising a support member, a pair of sparking electrodes imbedded within said support member with the sparking areas of said electrodes below the surface of said support member and exposed to the atmosphere, and an insulating member separating said electrodes for controlling the region of discharge.

3. A recording stylus comprising an insulating support member having an outer boundary surface adapted to bear on a recording surface and a substantially internally located recessed portion and a pair of sparking electrodes within said recessed portion and positioned below the outer boundary bearing surface area.

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