

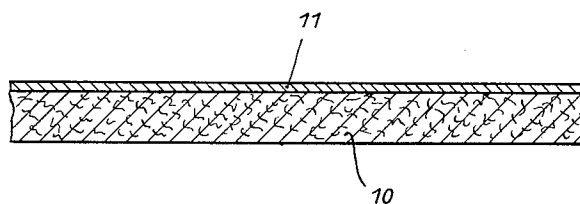
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RECORDING TAPE

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2,808,345

RECORDING TAPE

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3 Claims. (Cl. 117—107)

The present invention relates to a new and improved recording device of the type wherein a thin layer of metal is provided upon a layer of insulating material.

As used herein, the term "recording device" refers to any device upon which information may be recorded such as, for example, a recording tape, a recording cylinder, a record, a thin layer of metal on a paper backing, and other similar arrangements.

There are known in the prior art recording devices which comprise a thin surface layer of metal formed on a layer of insulating material. These devices are ordinarily used with measuring instruments. In operation, a pointed "writing" electrode which is usually connected to the indicating means of a measuring instrument rests on a minute area of the metal surface layer and a counterelectrode, usually in the form of a roller, engages a relatively large area of the surface layer. Current flows through the writing electrode to the second electrode and causes a portion of the very thin metallic surface layer contacted by the counterelectrode to burn out and disappear. Thus, if the recording device is slowly moved, relative to the writing electrode and the roller-type counterelectrode, there is produced a fine trace adjacent the contact point of the writing electrode. It is possible to obtain fairly good results when the surface layer is extremely thin, for example, not any thicker than a tenth of a micron. The surface resistance of the metal layer should be between 2 and 50 ohms. Thicker surface layers (5 to 10 microns) are practically useless for the purposes described above. Layers so thick have a proportionately lower resistance than the thinner layers and so high a current flows that instead of obtaining a sharply defined trace, there is produced instead a fuzzy trace which has a tendency to wander off course. Also, when such high currents are employed, the layer of insulating material such as paper, for example, often becomes damaged due to the excessive heat present in the contact area.

It is an object of the present invention to provide a recording device having a surface layer which gives accurate, highly defined tracings.

It is a further object of the present invention to provide a recording device having an extremely thin metallic surface layer which is relatively inert, and therefore not easily deteriorated, and which also is extremely durable.

In accordance with the invention, there is provided a very thin nickel surface layer on a layer of insulating material. In a preferred embodiment of the invention, the nickel has a thickness of one-tenth of a micron or less and a specific surface resistance of from 4 to 10 ohms.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description

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of specific embodiments when read in connection with the accompanying drawing which is a cross section of a recording device in accordance with the invention.

Referring now to the drawing, there is shown a recording device comprising a relatively thick backing layer 10 of insulating material such as paper and a relatively thin surface layer 11 of nickel. In practice, the nickel surface layer is usually 0.1–0.05 micron or less in depth. In a preferred embodiment of the invention, the surface resistance of the nickel layer is from 2–50 ohms, preferably from 4–10 ohms.

The nickel layer is formed on the insulating layer by causing the nickel to evaporate and then to plate out upon the insulating layer. This may be accomplished by cathodic evaporation of the nickel in vacuum or by thermal decomposition of a nickel compound such as for example nickel carbonyl.

An important advantage of using nickel as the surface layer of the recording device rather than the metals used in the prior art is that it is possible to obtain much thinner surface coatings. It is possible, for example, to obtain with a nickel surface layer of less than 0.03 micron a surface resistance of over 4 ohms which is a very suitable thickness and resistance for recording devices. When a metal such as zinc is used for the same purpose and a surface layer thickness of 0.1 micron is employed, there is obtained a surface resistance of about 2 ohms.

Many experiments have been performed to test the performance of the recording device having a thin nickel surface layer. It has been found on the basis of the above tests that much less electrical energy is required to burn-out a portion of the surface of the thin nickel layer and thereby cause it to disappear and form a recording trace than is required similarly to affect the prior art relatively thick metal surface layers. Moreover, it has been found that because of its relative inertness, nickel surface layers less than 0.05 micron in depth are even more stable and durable than zinc surface layers 0.1 micron and more in depth. If it were attempted to make the zinc surface layer on or close to the same order of thickness as it is possible to make nickel surface layers, the zinc would quickly disintegrate merely by the action of the air and in a few days or weeks would completely disappear. Nickel surface layers on the other hand have been life-tested and found to have an extremely long service life. Other materials such as aluminum which are sometimes employed as metal surface layers for recording devices, have the disadvantage that an oxide coating soon forms on the surface which causes an undesirable decrease in the conductivity of the surface layer.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of recording devices differing from the types described above.

While the invention has been illustrated and described as embodied in a recording tape, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. A recording carrier comprising, a layer of insulating material and a surface layer of nickel having a thickness in the range of 0.01 to 0.1 microns having a specific surface resistance of 3 to 20 ohms superimposed on said layer of insulating material. 5

2. A recording tape comprising, a strip-shaped band of paper, and a nickel surface layer having a thickness in the range of 0.01 to 0.1 microns and having a specific surface resistance of 4 to 10 ohms superimposed on said strip-shaped band of paper. 10

3. A recording carrier comprising, a strip-shaped band

of paper, and a nickel surface layer having a thickness in the range of 0.01 to 0.05 micron superimposed on said strip-shaped band of paper and having a specific surface resistance of 4 to 20 ohms.

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