June 24, 1930. C. W. MAYER ET AL 1,765,988

RECORDING DEVICE

Filed Nov. 10, 1927

Fig. 1

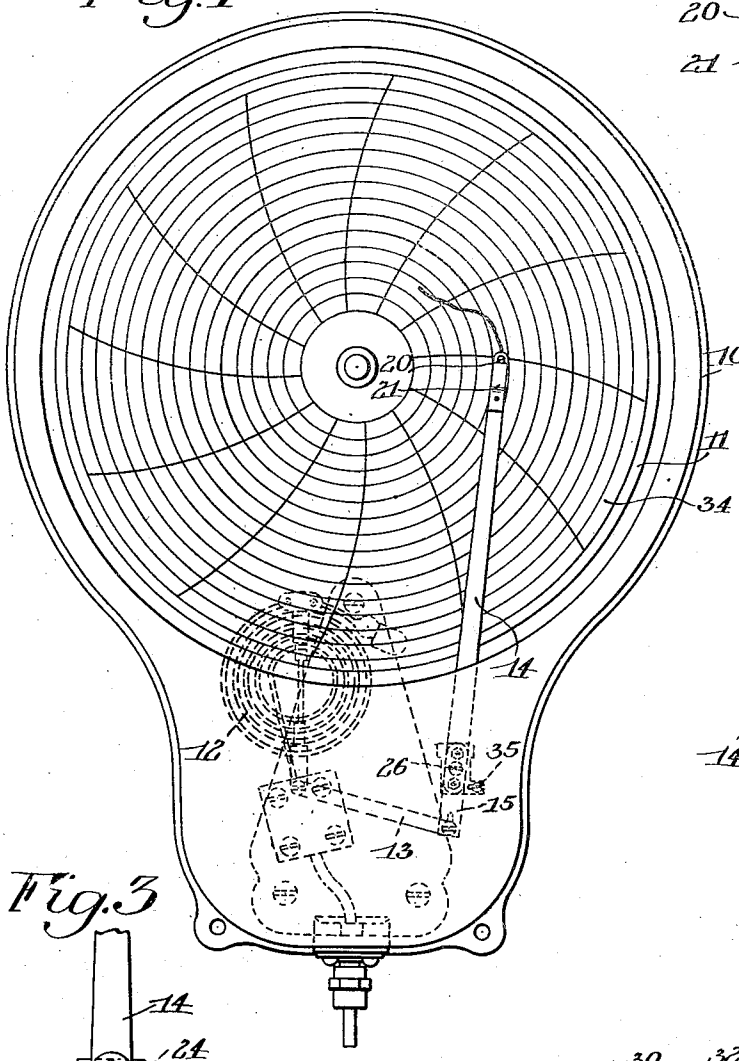



Fig. 2

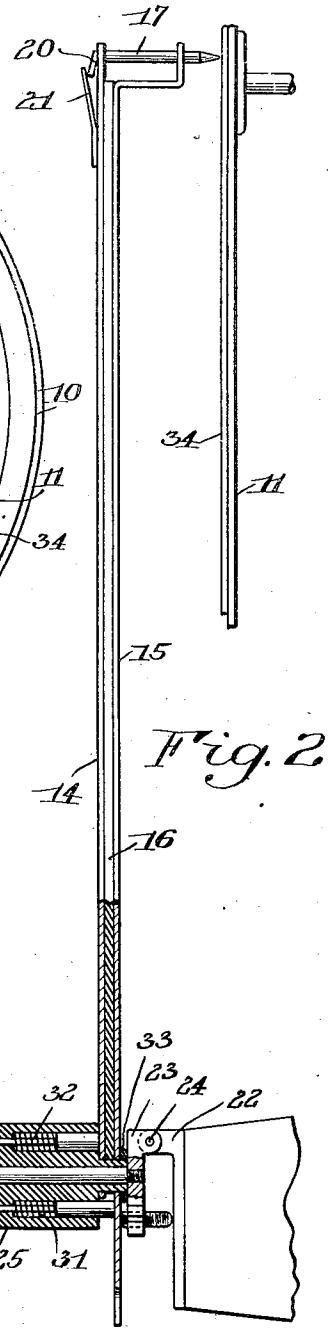



Fig. 3

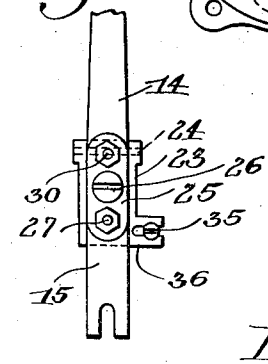
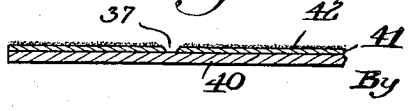



Fig. 4




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# UNITED STATES PATENT OFFICE

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## RECORDING DEVICE

Application filed November 10, 1927. Serial No. 232,434.

This invention relates to recording instruments of the type in which a recording sheet moves relatively to a movable stylus.

According to some present practices a sheet of colored paper provided with a substantially opaque surface coating of a different colored relatively soft material is mounted on the rotating portion of the indicator and a pointed stylus is held in contact with the coated surface and cuts a groove in the coating material or otherwise causes the colored surface of the sheet to become visible. It has been found, however, that in some instances, particularly in instances where very delicate instruments are used, such practices are not satisfactory. The stylus point enters the surface coating material and its movement is retarded thereby. Accordingly, an object of this invention is to provide a device of the above nature in which coated discs or sheets or webs of paper or other suitable material may be used satisfactorily. Another object is to provide an improved stylus arm structure. Another object is to provide an improved mounting for a stylus arm. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown one of the various possible embodiments of this invention,

Figure 1 shows the stylus arm of this invention applied to one of the usual forms of recording instruments;

Figure 2 is an enlarged side elevation of the stylus arm, certain portions being in section to show its structure and the manner in which it is mounted on its support;

Figure 3 is a plan view of the supported end portion of the stylus arm; and

Figure 4 is a view illustrating the effect of the stylus point on the coating material.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings in detail, there is shown in Figure 1 one of the usual forms of recording instruments having the improved stylus and stylus arm of this invention applied thereto. The recording instrument comprises the usual casing 10, rotatable support 11, and stylus arm actuating mechanism 12. The stylus arm is pivotally mounted adjacent one of its ends within the casing and has a bifurcated end portion which is connected to the actuating mechanism through the lever 13.

The stylus arm comprises a pair of metal strips 14 and 15 formed of any suitable metal which is a good conductor of electricity and spaced apart by means of the strip of insulating material 16. The strips 14, 15 and 16 may be connected together in any suitable manner, such as by means of insulated rivets or by means of a suitable cement. The strips 14 and 15 adjacent one end of the arm are provided with substantially concentric apertures through which the stylus 17 is adapted to extend, the strip 15 being offset in order to space the two bearings for the stylus a suitable distance apart.

The stylus is preferably formed of metal having a relatively high resistance. The composition and properties of the metal forming the stylus is, of course, determined by the temperature to which it is desired to heat the stylus and the voltage which it is desired to apply. In the embodiment shown in the drawings, the stylus has an offset end portion 20 which limits its movement in one direction and engages a leaf spring 21 carried by the strip 14 for limiting its movement in the opposite direction. A stylus having a short sharp point is preferable since in such a structure the heat is more readily conducted to and better retained by the extreme end portion.

The strip 15 adjacent the pivoted end portion of the arm extends beyond the strips 14 and 16 to provide an electrical contact surface.

The stylus arm is mounted on a base 22

which may be carried by the instrument casing, and which has a projecting portion to which the stylus arm support 23 is pivotally attached as at 24. A block of insulating material 25 has a reduced end portion which extends through concentric apertures in the strips 14, 15 and 16 which form the main body portion of the stylus arm. A bolt 26 extends through a central opening in the block 25 and locks the said block in position on the support 23.

Binding posts for connecting the stylus arm with a source of electricity are formed by the plungers 27 and 30 which extend through apertures in the block 25. Each of the members 27 and 30 has an enlarged end portion which fits within a correspondingly enlarged portion of the aperture in the block 25 through which it extends. Helical springs 31 and 32 are mounted on the members 27 and 30 and serve to hold the enlarged end portions of the said members in yielding engagement with the strips 14 and 15. A washer 33, formed of insulating material, spaces the strip 15 from the support 23.

The structure of the stylus arm and the means for connecting the said arm with a source of electricity permit electricity to be conducted to the stylus for heating purposes without the use of wire or other conductors which might retard the movement of the arm. The block 25 is normally held stationary and the pressure of the plungers 27 and 30 on the strips 14 and 15 is negligible.

A record sheet 34 provided with a surface coating of relatively soft wax-like material having a low fusing point is mounted on the support 11 and the point of the stylus is placed immediately adjacent the coated surface. The position of the stylus may be adjusted through the agency of the screw 35 carried by the projecting portion 36 of the support 23. The temperature of the stylus may be so regulated that in delicate instruments the stylus point may be spaced slightly from the coated surface and fusion of that portion of the coating material which is immediately adjacent the point will occur. The properties of most of the commercial coating materials are such that while in their normal states of application on the paper or other sheet material, they are substantially opaque, after fusion they become and remain transparent. In some instances, even when there is no direct contact between the stylus and the coating material, a channel such as that shown in Figure 4 at 37 may be formed, tracing the line of relative movement between the stylus point and the record sheet. Whether the material merely becomes transparent or a channel is formed the colored surface of the sheet material becomes clearly visible through the coating material.

In Figure 4 is shown an enlarged view of a portion of coated sheet material the coating material of which has been affected by the heated stylus. It will be noted that a well defined channel 37 is formed. The material shown in Figure 4 comprises a base sheet of fibrous or other material 40, a layer of wax-like material 41 and a surface layer 42 of the wax-like material having innumerable small particles of organic or inorganic material embedded therein. This product and the method of making the same from the subject matter form a separate application.

It has been found to be highly desirable in using coated paper on sensitive instruments to space the stylus point from the coated surface as shown in Figure 2, but it has been found that even on some of the sensitive instruments very good results may be obtained by allowing the stylus point to enter the coating material a short distance. The heat from the stylus causes the coating material immediately adjacent thereto to melt and it then offers little or no resistance to the movement of the stylus.

Another advantage of the stylus of this invention is that it permits the use of sheet material which may be coated with a substance which is relatively hard or flaky and which offers considerable resistance to the movement of the ordinary cold stylus. The stylus of this invention may be heated to any desired reasonable temperature, and accordingly it may pass with ease through coating materials having a considerable range of hardness or brittleness without danger of chipping the coating material and without placing too great a strain on the stylus arm actuating mechanism.

As many embodiments may be made of this invention, and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim as our invention:

1. In a recording instrument, the combination with a movable support and a sheet having a surface coating of relatively soft material mounted on said support, of a heated stylus positioned adjacent the coated surface of said sheet.

2. A recording device comprising a movable support, sheet material having a surface coating of fusible material mounted on said support, and an electrically heated stylus positioned adjacent the coated surface of said sheet material.

3. In a recording instrument, a stylus arm comprising a pair of spaced conductors, a stylus extending between the adjacent

ends of said conductors adjacent an end of said arm, and means connecting the other ends of said conductors to a source of electricity.

4. In a recording instrument, a stylus arm comprising a pair of spaced strips of metal, a stylus engaging an end portion of each strip, and means connecting the other end portion of each strip with a source of electricity.

5. In a recording instrument, a stylus arm comprising a pair of spaced strips of metal, a stylus formed of metal having a relatively high resistance connecting said strips adjacent an end of said arm, and an electric contact member frictionally engaging each of said strips adjacent the other end of said arm.

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