Feb. 10, 1942. D. H. SCHWEYER 2,272,780

THERMOELECTRIC MARKER

Filed June 12, 1939

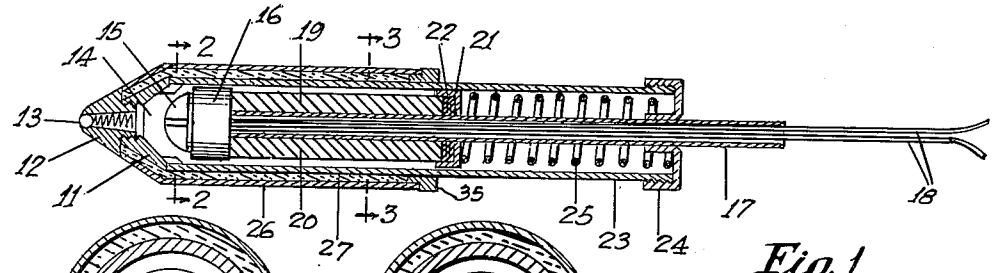


Fig. 1



Fig. 2

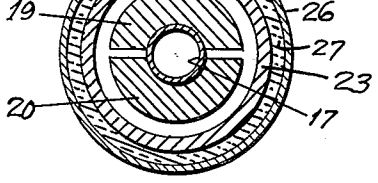


Fig. 3

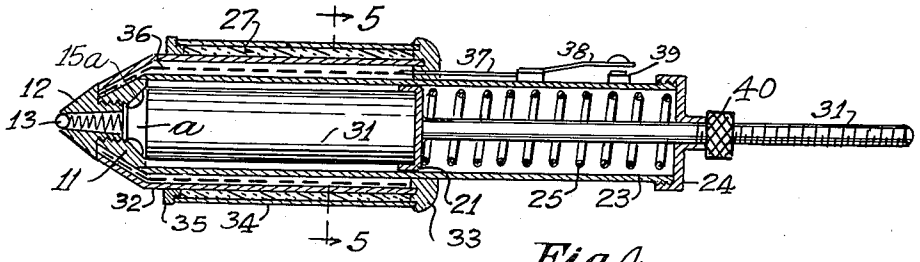


Fig. 4

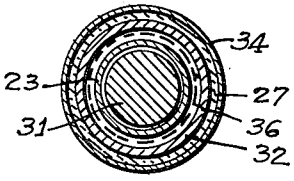


Fig. 5

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THERMOELECTRIC MARKER

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Application June 12, 1939, Serial No. 278,623

4 Claims. (Cl. 219—21)

This invention relates to marker instruments that may be used for applying a colored fluid to fabrics or other articles for marking them in any manner desired. The invention includes a marker instrument which is provided with a fusible marker compound which is normally in a solid state but which is reduced to a fluid state for application purposes by the use of an electric heating element incorporated in the instrument. The instrument is provided with a nozzle having a liquid chamber for receiving the melted compound and which is released in a fluid state by a ball valve on the point of the instrument. The invention also includes means for feeding the fusible compound to the electric heater; a radiator in the liquid chamber heated by the electric heater for maintaining the fluid in a liquid state as it is used. The invention also includes a heat insulating medium for the shell of the device so that it can be conveniently used by the operator.

These and other objects of the invention will be more particularly understood from the following specification and the accompanying drawing, in which:

Fig. 1 is a longitudinal section of one form of a thermo-electric marker embodying this invention;

Fig. 2 is a cross section on line 2—2 of Fig. 1;

Fig. 3 is a cross section on line 3—3 of Fig. 1;

Fig. 4 is a longitudinal section of another form of the device, and

Fig. 5 is a cross section on line 5—5 of Fig. 4.

This invention is for use with a solid marking compound which is applied in the liquid state but which, normally, remains solid and can be as conveniently used as a marking crayon or pencil. The marking compound contains a mixture having the required color pigment and a binder that has a quick break in viscosity which will readily flow through a small orifice. It should not soften below 130 degrees C. The binder may be a resin which, after application, will solidify into a thin film which is reasonably flexible and will hold on fabric. A flexilizer may be added to the compound to increase its flexibility and this will depend somewhat on the degree to which the compound will fuse. For ordinary purposes, and when applied to a fabric, the melting point should be above the heat of the water in which the fabric may be processed but the melting point must be within the range of the electric heating element with which the instrument is provided.

The instrument comprises a tubular holder which forms a handle for the marking device corresponding to the handle of a pen and the end is provided with a nozzle having a ball valve by which the marking compound, in a liquid state, is released for marking purposes. The marking compound is located in the tubular holder and is forced forward to the nozzle by a spring. The nozzle, or the writing end of the instrument is provided with an electric heating element which is connected in circuit when the instrument is in use and which fuses the compound at the nozzle, filling a chamber in the nozzle with liquid to be used through the ball valve. The liquid chamber is provided with a radiator which maintains the liquid that has been melted in a liquid state as it is used for marking purposes.

In one form of the device the electric heating element is located inside the tubular holder and has a central conduit for the electric conductors around which the marking compound is placed. In another form a cylindrical marking compound is located in the tubular holder, outside the tubular holder the electric heating element is placed and outside the heating element a heat insulation is provided to enable the operator to use the instrument in the heated state.

In the drawing, 11 is the nozzle which is provided with the point 12, having a spring seated ball valve 13 which connects with the liquid chamber 14 in the nozzle and in which chamber the radiator 15, connected with the electric heating element 16 projects and provides the heat necessary to maintain the compound in chamber 14 in a liquid state. A central tube 17 passes through the holding tube 23 and connects with the heating element 16, the electric conductors 18 for the heating element may be located in tube 17. Around the tube 17 the fusible marking compound is placed as indicated by the semi-cylindrical members 19 and 20, Fig. 3. These members are split longitudinally so that they can be replaced without threading on the central tube 17. These members are held in place by the cup shaped washer 21 which may be provided with a heat insulated washer 22 to prevent the spread of the heat from the compound to the outer end of the instrument. The shell or holder 23 is provided with screw cap 24, having an orifice through which the tube 17 passes and which engages the coil spring 25, located between the cap 24 and the washer 21 to feed the compound 18, 20, to the nozzle as it is melted away by the electric heater 16 located at the discharge end of the device. There is a clearance between the heater 16 and the tube 23 and also between the members 19 and 20 and the tube 23 which

enables the fused compound to flow into the chamber 14.

Opposite the marking compound the device is heat insulated as indicated by the insulating jacket 27 around the tube 23 and held in place by the cylindrical cover 26. This jacket is supported by collar 35 on the tube 23 and tapers around the nozzle 11 as indicated to insulate the portion of the instrument where the heat is applied. The heater is located at the point of the instrument and away from the body which forms the handle.

In the construction of Fig. 4 the electric heating element 36 is applied to the outside of the tubular holder 23 and is held in place by the jacket 32. Over this jacket the heat insulator 27 is placed and is held in place by the cylindrical cover 34. This construction is held in place by the collar 33 at the outer end and by the collar 35 at the pointed end. The conductor 37, leading to the heating element 36 is controlled by the spring switch 38, connecting with conductor 39, embodied in the circuit of the electric heater so that when the device is not in use the circuit of the heater is automatically opened.

The nozzle 11 is provided with radiating fins 15a opening into the chamber a of the nozzle to fuse the compound 31 which is fed forward by the cup shaped washer 21 and spring 25. The tension of spring 25 on the compound 31 is regulated by stem 31, connected to 21 and adjusted by the knurled nut 40. This prevents the nozzle from overfeeding and choking with the partially melted compound.

The marking compound for this device can be manufactured and stored in a solid state and does not deteriorate. The semi-circular form of the compound indicated in Fig. 3 enables the compound to be replaced around the tube 17 without interfering with the electrical connections.

This invention relates to the general type of marking instruments shown in co-pending application 245,890 filed December 15, 1938.

Having thus described my invention, I claim:

1. A marker instrument comprising a cylinder holder for holding and directing the instrument, an electric heating element limited to the discharge end of said holder and of a size to substantially fill the cylinder, a central tube connected with said heating element and in which the electric conductors for the heating element are located, a fusible marking compound in said cylinder in rear of the heating element and exposed to said heating element to liquefy the compound in said tube and a nozzle at the discharge end of said tube for applying the marker in the fluid state.

2. A marker instrument comprising a tubular holder for holding and directing the instrument having a nozzle at one end and a chamber connecting with said nozzle, an electric heating element, a radiator having fins extending into said chamber adjacent the nozzle and heated by said heating element, a fusible marking compound in said holder having one end exposed to the heating element and the fused material exposed to said radiator to liquefy the marker material as it is applied to said nozzle.

3. A marker instrument comprising a tubular holder having a nozzle at one end, an electric heater associated with said nozzle, a central member in said holder, a plurality of fusible marking bars in said holder, a cup-shaped member holding said bars in place and a spring engaging said member and said holder for forcing said bars into said nozzle to fuse said bars for application by said nozzle, said central member supporting said electric heater and marking bars.

4. An instrument for melting waxy substances, comprising a tubular holder having a centrally located discharge nozzle at one end normally closed, an axial member in said holder and supported from the end opposite the nozzle, an electrical heating element larger in diameter than said axial member secured to the end of said member, and located adjacent said nozzle, bars of the material to be melted secured longitudinally to said axial member with their ends adjacent said heating element, a spring for feeding bars to said heating element and means for opening the nozzle to release the melted material as the instrument is used.

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