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Hand-held electromagnet-probe

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Abstract

Description of a hand-held electromagnet of variable field strength consisting of a soft iron core wound with magnet wire powered by a 9 V battery.

Hand-held electromagnet-probe

An electromagnet-probe is a useful tool to selectively remove magnetic grains from a disaggregated sample. This hand-held device consists of a soft iron probe wound with magnet wire and powered by a 9 volt battery. For convenience, a push-button switch is located on the wooden handle of the probe to energize the magnet windings, a current reversing switch is located on the control box, and the intensity of the magnet is controlled by means of a variable resistor (Fig. 1). Purging the sample of magnetic grains entails using the electromagnet at full field strength. When the soft iron core begins to retain some residual magnetism, this may be erased by setting the resistor to minimum field strength position and momentarily reversing the current. Single magnetic grains can be picked from a sample by using the probe at less than full field strength.

The copper magnet wire, American Wire Gage #30 of 0.010″ diameter, is wound into two layers around a soft iron core 1/4″ in diameter for 2″ then wrapped with plastic electrical tape (Fig. 2). An inexpensive 9 V transistor radio DC power supply that operates off 115 V AC may be substituted for a 9 V battery.

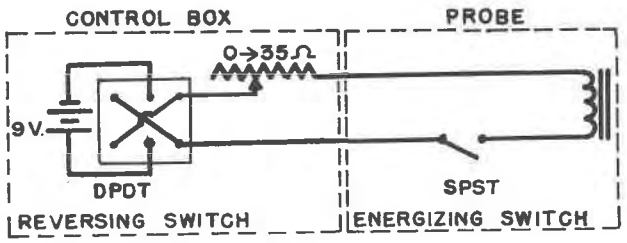

FIG. 1. Schematic wiring diagram for hand-held electromagnet-probe.

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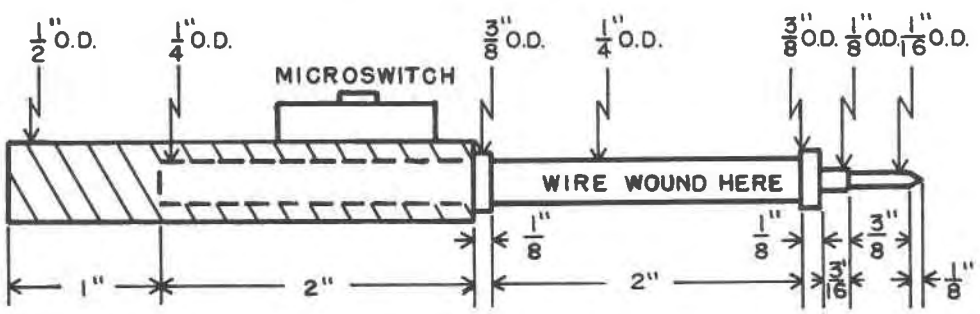

FIG. 2. Detailed dimensions for soft iron core and wooden handle of probe.