March 19, 1929. H. T. SCOTT-HUNTINGTON 1,705,480

ELECTROSCOPIC APPARATUS FOR TESTING THE CONDUCTIVITY OF VARIOUS MATERIALS

Filed July 30, 1924

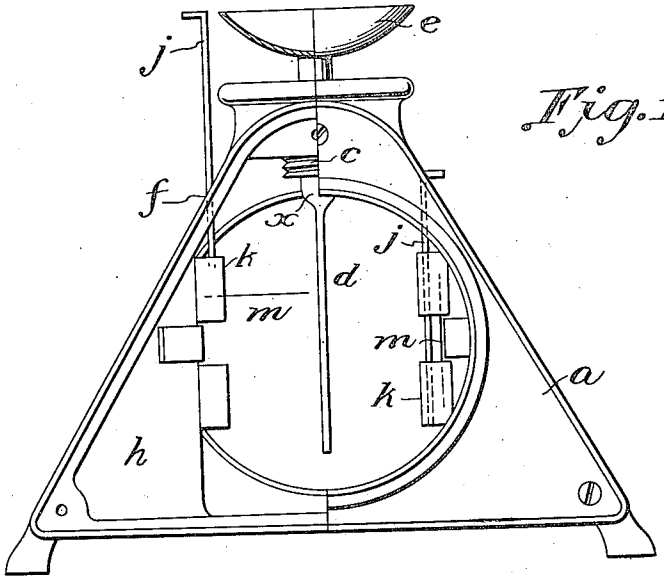


Fig. 1

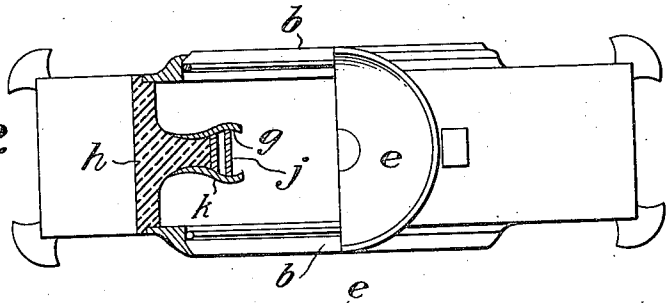


Fig. 2

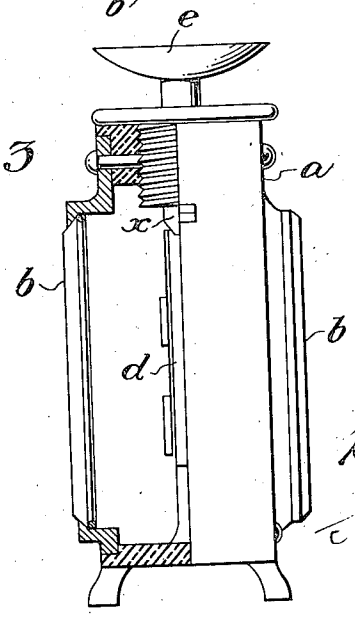


Fig. 3

Inventor:
Humbert Thurston
Scott Huntington.

Patented Mar. 19, 1929. 1,705,480

UNITED STATES PATENT OFFICE.

HUMBERT THURSTON SCOTT-HUNTINGTON, OF HARROW, ENGLAND, ASSIGNOR TO UNIVERSAL TEXILSCOPE CO. INC., A CORPORATION OF NEW YORK.

ELECTROSCOPIC APPARATUS FOR TESTING THE CONDUCTIVITY OF VARIOUS MATERIALS.

Application filed July 30, 1924, Serial No. 729,095, and in Belgium January 30, 1924.

It is acknowledged that in previous proposals attempts have been made, more or less successful, for the determining the complete or partial insulative qualities of wool, silk, and also of the existence of electro-static instruments for measuring the ionization of gases or the varying intensities of the Röntgen rays.

The present invention refers more particularly to the ascertainment of conductivity or specific inductive capacities in quartz, minerals, and porous structures and the insulative properties or characteristics of various insulating materials or compositions, and the object of the present invention is to provide portable means for determining the electrical conductivity of such materials.

In the accompanying drawings the invention is schematically illustrated according to the present invention; like letters referring to like parts.

Fig. 1 is a front elevational view of my improved structure, partially in section, and with a portion of the cover plate removed to better illustrate the position of the parts,

Fig. 2 is a top plan view of the structure, showing a part thereof in section, and,

Fig. 3 is a side elevational view of the structure with a portion thereof cut away to show the position of the operating parts and their relation to each other.

It is known that the diamond, emerald, and similar "precious" stones, quartz, and like matter may be successfully manufactured by the various synthetic processes. If such minerals, quartz and the like are extracted naturally, its conductivity is virtually nil therefore contacting them with the charged electrode of this apparatus will not discharge or neutralize the electro-statically induced currents which may have been transmitted to the said apparatus; contrariwise, any imitations of such matter, possessing any conductivity will soon become manfest by the indicating media of this apparatus, this latter media becoming partially or wholly discharged of the said currents transmitted to it, thereby causing the indicating media to deviate materially from their charged position, and it will thereby manifest the presence of such conductivity, in any matter or composition.

The triangular body, *a*, Fig. 1, may be made with one or more sections, *b*—*b*, covered with transparent or translucent material permitting observation of the apparatus' interior. From the apex of this body protrudes the insulator, *c*, made of any suitable insulating material, preferably ebonite. The channel, *x*, is bored thru this insulator into which is fitted the electrode, *d*. On the end of the electrode's exterior is attached the cup, *e*, these two receiving and retaining the electrostatic currents transmitted to them.

Thru the body, *a*, may be pierced the slots, *f*—*f*, which lead, to and are in alinement with, the grooves *g*—*g* of the detachable plates, *k*—*k*. These plates may be affixed by slipping them over the abutments, *h*—*h*. Into these grooves slide the covers, *j*—*j*, acting as protectors to the indicating media, or arms, *m*—*m*, while the apparatus is in a state of rest. These indicating media may be made of any composition, preferably of metal. In this case they are of gold extraction and oblong in shape. Their upper ends are attached to the plates in such manner as to permit the major portion of its length to dangle loosely. That portion of the electrode which projects within the casing is reduced in mass in order to better distribute the electrostatic charge thereon.

The primary function of the insulator is to retain, to the utmost measure, the electrostatically induced currents. The retention of these currents or energies is a cardinal feature of this invention, for such retention depends upon the extremely non-hygroscopic properties of the material used for the said insulator and the manner in which this is affixed to the body of the apparatus. The apparatus may be charged by supplying a charged body to the cup *e*. It is presumed, however, that the covers, *j*—*j*, have been lifted wholly so as to uncover the arms, *m*—*m*.

Testing.—Having thus charged the apparatus, the material to be tested is now lightly placed upon, and contacting it with, the cup, *e*. If there is any conductivity within that matter, the indicating arms will now relent their position, (in this case from the horizontal). This relention or relaxation of their position from the charged state will be in proportion to the degree or amount of conductivity or specific inductive capacity contained by the matter. This will be so in imitations of many "precious" stones or quartz, in many real "semi-precious" stones, such as the agate, blood-jasper, moonstone, and the

like. In porous structures, such as the turquoise, rubber, coral adulterated oils, vegetable products, such as cotton, acetated silkens or wood pulp and other matter or composition the porosity of the matter controls to a considerable degree its electric conductivity, as, for example, in the case of turquoise, the genuine turquoise has considerable porosity and thus when presented to the cup-shaped portion of the electrode tends to discharge an electrostatic charge therefrom and cause the metal leaves to fall to a substantially definite extent. An artificial turquoise would possess a degree of porosity at variance with that of the genuine, and would, on presentation to the cup-shaped portion of the electrode, cause such appreciable variance in the movement of the metal leaves, as compared with the genuine, as to immediately indicate its lack of genuineness to the observer. Contrariwise if the matter possesses no conductivity or specific inductive capacity such as the real or "natural" diamond, emerald, feather, wax, fleece or wool from animals, spawn of insects, such as the silk, and the like, the charged position of the indicating media will not be altered by such contacting, but will be altered by imitations or adulterations of the above materials, providing said imitations or adulterations or composed of or include materials possessing more or less conductivity or specific inductive capacity than the genuine material.

The apparatus is so made as to permit the matter being tested to be in constant ground with the earth, through the medium of the operator's personal and/or natural touch.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A portable electroscopic apparatus for testing the conductivity or specific inductive capacity of materials, comprising a casing provided with grooves, an insulated electrode fixed to said casing, said electrode being provided with an external cup, one or more flexible metal leaves mounted in each of said grooves and adapted to be attracted by said electrode and protecting members secured to said casing and adapted to slide in said grooves to protect the leaves when the apparatus is not in use.

2. A portable electroscopic apparatus for for testing the conducivity of materials which comprises a triangular shaped casing provided with transparent sections located at opposite sides thereof, an insulating bushing positioned in said casing and located at the apex thereof, an electrode mounted in said bushing and provided with an enlarged inverted cup-shaped portion located outwardly of the casing and having a reduced lower portion projecting within the casing and located substantially centrally thereof, flexible metal leaves located upon oposite sides of the reduced lower portion of said electrode, and means for preventing movement of said flexible metal leaves when the apparatus is not in use.

3. A portable electroscopic apparatus for testing the conductivity of materials which comprises a triangular shaped casing provided upon opposite sides thereof with transparent sections, an electrode located at the apex of said triangular casing and insulated therefrom, said electrode being provided with an enlarged cup-shaped portion located outwardly of the casing with the concave face thereof uppermost in the normal position of the casing and having a reduced lower end portion located within and substantially centrally of the casing, flexible metal leaves located upon opposite sides of the reduced portion of said electrode, and slidably mounted cover for preventing movement of said flexible metal leaves when the aparatus is not in use.

Dated this 4th day of September, 1925.

HUMBERT THURSTON SCOTT-HUNTINGTON.