(No Model.)

W. E. AYRTON & T. MATHER.

SCREENING ELECTRICAL OR OTHER INSTRUMENTS AND APPARATUS.

No. 546,802. Patented Sept. 24, 1895.

Fig. 1.

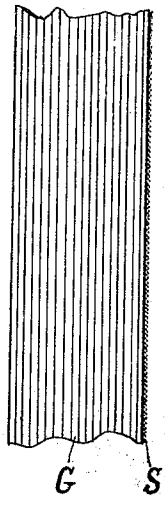

Fig. 2.

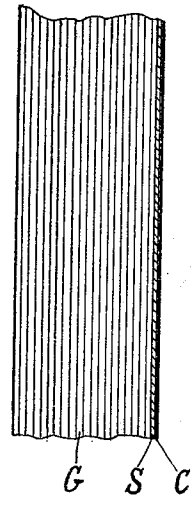

Fig. 3.

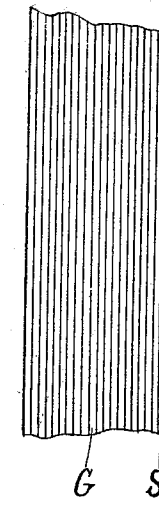

Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM EDWARD AYRTON AND THOMAS MATHER, OF LONDON, ENGLAND.

SCREENING ELECTRICAL OR OTHER INSTRUMENTS AND APPARATUS.

SPECIFICATION forming part of Letters Patent No. 546,802, dated September 24, 1895.

Application filed July 3, 1893. Serial No. 479,523. (No model.) Patented in England May 16, 1893, No. 9,753.

To all whom it may concern:

Be it known that we, WILLIAM EDWARD AYRTON, residing at 41 Kensington Park Gardens, and THOMAS MATHER, residing at 19 Agamemnon Road, West Hampstead, city of London, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Screening Electrical and other Instruments and Apparatus from the Influence of Disturbing Electric (not magnetic) Forces, (for which we have obtained Letters Patent in England, No. 9,753, dated May 16, 1893;) and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

Our invention has for its object the screening of electrical and other instruments and apparatus from disturbances caused by electric forces.

The improvements consist in forming, coating, or preparing the glass front, shade, or other transparent substance through which the position of the working parts, pointer, or other indicating or recording mechanism or device is seen, so as to produce a screen which is electrically conducting and transparent, thereby shielding them from being affected by external electric forces, while permitting any desired part to be seen.

Many measuring-instruments have their indications or records temporarily altered when the glass which covers the pointer or working parts is cleaned, owing to the glass being electrified by the cleaning process, and electrical instruments on high potential circuits are influenced when the hand or other conductor whose potential differs considerably from that of the working parts is brought near. To prevent these alterations we use a conducting-screen; but instead of employing sheet metal, foil, wire netting or gauze, which has hitherto been customary, we form the screen in such a way as to be transparent or translucent, in order that no portion of the working parts, pointer, or other indicating mechanism or device is obscured by the presence of our screen.

In some cases the screen is formed on the inside of the glass or other transparent cover, whereas in other instances the screen is outside the glass or is separate therefrom.

In the accompanying drawings we have illustrated the application of our conducting-screens to glass or other transparent covers or casings.

All the figures represent sections of portions of the covers of instruments or apparatus to be screened from electric forces.

Figures 1, 2, and 3 are drawn to a large scale, so that the relative thickness of the cover and of the screen may be fairly correct, while in Fig. 4 the scale is about full size.

In all the figures similar parts are indicated by the same letters, G denoting the glass or other transparent cover, and S the conducting-screen.

One method of forming a screen on the cover is to smoke the glass lightly by supporting it over a flame which is smoking a little. By holding the glass some distance above the flame and keeping it in motion, a thin deposit of carbon is put on, which acts as an efficient screen without seriously impairing the transparency of the glass.

Instead of a film of carbon, attenuated deposits of silver, mercury, zinc, or other metal which can be deposited chemically, electrically, or mechanically, or vaporized by heat, may be used. A section of cover and conducting-screen formed by deposition of carbon or metal is represented in Fig. 1, the deposit being indicated by the dotted lines to the right of the figure; but the method which we have found best is the following: Dissolve one-fourth of an ounce of transparent gelatine in one ounce of glacial acetic acid heated to 100° centigrade, and while the solution is still hot add to it a quantity of dilute sulphuric acid, (eight parts water and one part concentrated acid, by volume,) equal to half its volume, and mix thoroughly. Polish the glass to be coated, and heat it as hot as it can be comfortably held in the hands. Then apply the mixture of gelatine and acids with a soft brush and allow to stand in a dry place for twenty-four hours. After this time the coating will be nearly but not quite hard. As a protection for the conducting film so formed, one or more coats of Griffith's transparent antisulphuric enamel, consisting of gum dis-

solved in fusel oil, is put on. This form of screen is shown in Fig. 2, where G is the cover to which the screen is applied, S the conducting layer, and C the protective coating. Before applying the enamel or other varnish over the conducting coating above described, an intermediate coating, consisting of gelatine dissolved in acetic acid or in water, may be given, in order to form a harder surface, and the varnish subsequently applied. In cases where there is no probability of the surface being rubbed or touched we may dispense with the protecting coating of varnish. Fig. 3 represents this form of screen, G being the cover and S the conducting layer unprotected by varnish. Coatings of other substances, such as isinglass, starch, gums, or other transparent cements rendered conducting may be employed. In some cases cells containing conducting and transparent liquid or jelly may be used as screens. Fig. 4 shows this method of making transparent conducting screens, G G being the sides of the cell, and S the transparent conducting liquid or jelly.

Our invention is particularly useful for electrostatic measuring-instruments where the working forces are feeble. Electrostatic voltmeters usually have their indications affected by bringing the hand or other conductor near them or by rubbing the glass front. Our invention enables us to completely screen them from such influences without hiding the pointer or working parts behind opaque covers. Electroscopes may be similarly screened by having the glass covers coated as described, instead of by tin-foil, as is usually done, and electrometer jars may have their outsides coated, thereby allowing the working parts to be seen, and at the same time forming efficient screens.

It will be readily understood that our invention is useful not only for electrostatic measuring-instruments, but for electrical measuring-instruments of the electromagnetic or other types whose indications or records are liable to be influenced by external electric forces. It can also be employed with advantage to screen any kind of instrument or apparatus, whether electrical or otherwise, from disturbances due to electric forces, which might otherwise interfere with their correct working.

Having fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. In combination with a transparent cover for electrical and other instruments and apparatus a transparent electrically conducting screen S as described.

2. In combination with a transparent cover for electrical and other instruments and apparatus a transparent electrically conducting screen formed of adhesive material as described.

3. In combination with a transparent cover for electrical and other instruments and apparatus a transparent electrically conducting screen of adhesive material covered by a protective coating as described.

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