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X-RAY OPAQUE MARKING MEANS

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1

In the use of highly penetrating radiations such as alpha, beta or gamma rays from radium or other radioactive substances, or where photographic plates or films are exposed, such as in metal inspections, medical and surgical practice, etc., it has been customary to mark the plate or film for identification by placing formed letters of sheet lead for the identifying data, such letters being laid on the casette or film holder, and by their shielding or blocking out the radiation, produce the desired identification markings in the developed silver image. Such procedure, while positive in results, is inconvenient and particularly awkward in many instances and not applicable to some purposes. In accordance with the present invention however, markings or blocking-out as desired may be applied on the film holder or casette or on a sheet of material laid thereon and can be easily and quickly removed therefrom after the exposure, the negative carrying the required markings or blocking, while the film holder is ready for re-use. Furthermore special markings not available in stock forms may be employed and areas may be circled or otherwise identified or blocked out, as desired, all with improved speed and facility. Other objects and advantages will appear from the following description.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In accordance with the invention, preferably a pencil or crayon is provided comprising a material in fine particle size having metal atoms of high atomic weight, in a carrier or vehicle substance. By metal of high atomic weight is here meant a metal of atomic weight at least 184, and particularly conveniently available are such metals as lead, bismuth, thallium, etc. Preferably, the metal is in colloidal form, as may be provided by the known methods of preparing metals in colloidal condition. With particular convenience, the carrier or vehicle may be a wax, and if a water-soluble type of wax or material of wax consistency be employed, after using the crayon or blocking-marking on the film holder, such as a metal casette, it may be quickly removed by a damp cloth or like suitable means ready for the next use of the film holder. If

2

a non-water-soluble wax is used, the markings may be removed by use of naphtha or other volatile wax solvent. Desirable water-soluble waxes are for instance the solid waxy polyglycols, polyethylene oxide (commercially known as "Carbowax"), etc. The physical consistency is the important criterion, rather than any specific chemical structure. Non-water-soluble materials applicable are for instance cerecine, paraffin, stearine waxes, and the like. The amounts of colloidal lead or the like and the wax or carrier may be 50–80 per cent of the former and 20–50 per cent of the latter. A plasticizer in amount up to 5 per cent (displacing corresponding amounts of the wax) may be incorporated where desired, instances of such suitable plasticizers being polyglycols, glycol ethers and esters, glycerine ethers and esters, etc.

As an example: A normally solid water-soluble wax, such as afore-noted, is melted, nad the heat is removed and as it begins to cool about 75 per cent of colloidal lead having about 70 per cent or more of its particles in the size range of 1 to 15 microns, is stirred in, together with 5 per cent of a polyglycol plasticizer to produce a rather thick paste. The mixture is then formed into desired pencil or crayon shape, as by a mold or by extruding through a die, and allowed to cool and harden. The final product may be in the form of a stick or rod either not covered or covered with wood, metal, paper or other casing adapted to facilitate usage.

As another example: In similar procedure, the wax is melted and about 65 per cent colloidal lead or other metal if high atomic weight in finely divided form is incorporated in the wax together with about 15 per cent of a uranium salt such as uranium sulphamate.

In similar manner, salts or compounds of the metals of high atomic weight, i.e. above 184, such as uranium, bismuth, thorium, lead, thallium, etc., may be applied along with the colloidal metal usually of a lesser atomic weight and substituting a corresponding amount thereof. These combinations, including a heavier metal salt together with the finely divided metal having a lesser atomic weight, possess improved blocking power and are particularly useful for work involving gamma rays and hard X-rays but are also fully effective for the softer less penetrating X-rays. Compositions omitting the heavier metal salt component may be satisfactorily used wherever their blocking power is sufficient, as for the softer, less penetrating X-rays.

In some instances instead of a normally solid

carrier, a liquid base, such as a cellulose ether or ester or an alkyd or Bakelite resin clear enamel or varnish dispersed in an organic solvent may have the desired amount of colloidal metal or mixture of colloidal metal and compound of heavy metal in proportions as aforenoted. Such composition may be used with a marking brush or pen.

With compositions as herein provided, identification markings such as in light metal alloy inspection work and other metal inspections, can be quickly and conveniently made, and identification or blocking out to any extent desired may be applied, and after serving its purpose, may be quickly and easily removed, the finished photographic plate or film carrying the desired marking or blocking. Similarly in anatomical X-ray work, markings and blockings may be made as desired.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A marking material for blocking X-rays and the like, comprising colloidal lead and a compound of a metal of atomic weight at least 184 and a normally solid water-soluble material of wax consistency.

2. A marking material for blocking X-rays and the like, comprising colloidal lead and a compound of a metal of atomic weight at least 184 and a normally solid wax.

3. A marking material for blocking X-rays and the like, comprising colloidal lead and a compound of a metal of atomic weight at least 184, and a vehicle.

4. A marking material for blocking X-rays and the like, comprising a colloidal metal of atomic weight at least 184 and a normally solid water-soluble material of wax consistency.

5. A marking material for blocking X-rays and the like, comprising a colloidal metal of atomic weight at least 184 and a normally solid wax.

6. A marking material for blocking X-rays and the like, comprising a colloidal metal of atomic weight at least 184, and a vehicle.

7. A marking material for blocking X-rays and the like, comprising colloidal lead, and a normally solid water-soluble material of wax consistency.

8. A marking material for blocking X-rays and the like, comprising colloidal lead, and a normally solid wax.

9. A marking material for blocking X-rays and the like, comprising colloidal lead, and a vehicle.

10. A marking material for blocking X-rays and the like, comprising a vehicle with incorporated colloidal metal of atomic weight at least 184.

11. A marking material for blocking X-rays and the like, comprising colloidal lead at least 50 per cent, polyglycol of wax consistency, and a small per cent of plasticizer.

12. A marking material for blocking X-rays and the like, comprising a colloidal metal of atomic weight at least 184 in amount of at least 50 per cent, and a water-soluble polymerized aliphatic material of wax consistency.

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