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COMPLETE SPECIFICATION.

"Improvements in and relating to Powders or Compositions for use in Artificial Lighting for Photographic purposes."

I, GOTTLIEB KREBS, Doctor of Philosophy, of the "Helios" Chemical Factory, Offenbach-on-Main in the Empire of Germany, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

5 This invention relates to powders or compositions for use in producing artificial light for photographic purposes. The powders now most largely used for these purposes, both for instantaneous and "time" illumination, consist of a mixture of finely powdered metallic magnesium or aluminium or both, with chlorates and perchlorates of alkali metals or of the alkaline earths or rare
10 earths, or with the hypo-oxides and nitrates of said metals, with picric acid, and so forth. Such "flashlight" powders are very explosive and in burning develop large volumes of smoke or fumes which are very noxious; the smoke evolved upon the combustion of a composition containing manganese with magnesium in particular has been found to be poisonous, and its effects are known in the
15 complaint called the "manganese illness".

According to the present invention an almost smokeless and non-explosive powder for both flashlight and "time" purposes, for both ordinary and three-colour photography is produced by:—

(1) Mixing finely powdered, desiccated or crystallised chrome alum, potash
20 alum, sodium alum, iron alum, ammonium alum, or other alum with finely powdered magnesium or aluminium or a mixture of both; or

(2) Mixing finely powdered, desiccated or crystallised sulphate of copper or other metallic sulphate, or sulphate of alkaline or alkaline-earth metals, or of cerium, thorium, iridium or caesium with finely powdered magnesium or
25 aluminium or a mixture of both.

The essential novelty consists in the employment of an alum or a sulphate as mentioned above mixed with magnesium or aluminium or both for photographic purposes. By mixing these flashlight powders with suitable quantities of oxides or carbonates of alkaline earths, or with glass powder, silicic acid or silicates,
30 a slow-burning "time" powder may be produced.

The following are examples of powders made up in accordance with this invention; of course the proportions of the constituents may be varied:—

(a) A FLASHLIGHT POWDER

10 parts of magnesium or a mixture of 8 parts of magnesium and 2 parts of
35 aluminium, with

10 parts of finely powdered, desiccated chrome alum or other alum or sulphate as above specified. (In case crystallised salts are used the quantity taken may be increased until the same equivalent proportions are established).

(b) A SLOW-BURNING "TIME" POWDER

40 100 parts of magnesium, or a mixture of 80 parts magnesium and 20 parts of aluminium, with

100 parts of chrome alum or copper sulphate, and

[Price 8d.]



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20 parts of oxide or carbonate of alkaline earths, silicic acid, powdered glass, or of other metallic silicates.

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. The process for the production of powders for flashlight and time illumination, consisting in the mixture with magnesium or aluminium or with both, of dessicated or crystallised alums, or sulphates of copper, cerium, thorium, and so forth with or without alkaline earths and with or without additions of oxides or carbonates of alkaline earths, silicic acid, glass powder or other silicate, substantially as and for the object set forth. 10

2. As an article of manufacture, the improved powders for photographic purposes containing alums or sulphates mixed with magnesium or aluminium, with or without glass powder and the like, substantially as hereinbefore described.

Dated this 14th day of December 1904.

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