

UNITED STATES PATENT OFFICE.

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TO THE DAYLIGHT INCANDESCENT MANTLE COMPANY, LIMITED,
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MANUFACTURE OF FLUID FOR IMPREGNATING FIBERS FOR INCANDESCENT LIGHTING.

SPECIFICATION forming part of Letters Patent No. 609,702, dated August 23, 1898.

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To all whom it may concern:

Be it known that I, GERHARD BODO PUCHMÜLLER, merchant, a subject of the Emperor of Germany, residing at Schöneberg, near Berlin, Germany, have invented an improved fluid for impregnating fibers, fabrics, or bodies for incandescent lighting and methods of making the same, of which the following is a specification.

This invention relates to the manufacture of an improved fluid for impregnating fibers, fabrics, or bodies composed thereof which are to be rendered incandescent by means of a non-luminous flame for the purpose of emitting light.

The improved fluid, after the burning off of the fibers or fabric impregnated therewith and the directly-succeeding incandescing of the firmly-cohering ashes, yields a cement-like or porcelain-like compound which serves as a very efficient basis or skeleton for an incandescent body. The said fluid, which consists, essentially, of four oxids, hereinafter clearly indicated, has small quantities of such other oxids added to it as will produce the lighting effect and influence it as regards light, color, and strength.

Strontium oxid, zirconium oxid, barium oxid, and aluminium oxid, in the proportions of from twenty to thirty per cent. of each, are dissolved by means of a suitable acid, or the nitrates of strontium, zirconium, barium, and aluminium are dissolved in water. If a fiber or fabric be impregnated with fluid obtained in this manner and be calcined after being dried, a firmly-coherent ash is produced for incandescence, and which, in consequence of the above-mentioned qualities, forms a very good basis or skeleton for an incandescent body. It must, however, be specially pointed out that the oxids of strontium, zirconium, barium, and aluminium, if employed separately, do not yield a useable skeleton, but only by the above-mentioned combination and simultaneous use of the said four oxids. Thus, for instance, first, oxid of strontium alone causes a mantle impregnated therewith when burned off to shrink strongly and then by attracting moisture to easily fall to pieces;

second, oxid of zirconium alone imparts an excellent durability to a mantle impregnated therewith and calcined, but even after the addition of one of the light-giving oxids hereinafter described has almost no illuminating power; third, oxid of barium alone only produces an ash which falls to pieces at the slightest touch, and, fourth, oxid of aluminium alone melts during the burning off in a pressure gas-flame to the complete destruction of the skeleton.

The cement-like or porcelain-like compound of the four oxids hereinbefore mentioned simultaneously employed only yields a little light in a Bunsen flame and also loses considerably in lighting power after burning a short time. In order to obtain a good light of durable power, there is added to the fluid obtained by the solution of the said four oxids a small quantity of light-giving dissolved metallic oxids, which, after the burning off of the saturated fibers and very energetic incandescing of the remaining ashes, yield with the oxids of strontium, zirconium, barium, and aluminium a compound which has equally the above-mentioned property of durability and does not affect that of the four oxids first named, but which in the Bunsen flame yields an incandescent light of blameless constitution. The choice of the light-giving metallic oxid employed depends on the color of the light desired, and to the dissolved oxids of strontium, zirconium, barium, and aluminium there is added either of the following metallic compounds containing the metal or metals which it is desired to add to the compound above mentioned in a form easily soluble in water, so that after ignition the said metal or metals will be obtained in an oxidized or metallic form, viz: chromic acid, uranic acid, wolframate of ammonia, molybdate of ammonia, platinic chlorid, nitrate of silver, magnesium nitrate, and antimony trioxid in a solution containing tartaric acid.

The addition of the several oxids and metals acts on the incandescent bodies approximately as follows: First, chromium oxid imparts a red color to the light; second, uranium oxid produces a bright yellow; third, wolfra-

mium oxid yields a reddish-yellow light; fourth, molybdenum oxid yields a greenish-yellow light; fifth, platinum produces a strong yellowish red; sixth, silver has not much action on the light, but imparts considerably greater coherence and durability to the ash; seventh, magnesium oxid yields a white light and increases the yield of light, and added in larger quantities, it affects the durability of the mantle or incandescent body, and, eighth, antimony oxid also increases the yield of light, but too large a quantity of it makes the mantle brittle.

It is not advisable to add the oxids separately to the incandescent body, because then the yield of light is only a moderate one. A maximum of light is only obtained by a suitable mixture of said oxids. The oxids are only to be employed in very small quantities, so that only milligrams and fractions of milligrams come to the separate mantles. Up to about three per cent is used, according to the tint of light required.

A yellowish-white light very agreeable to the eye is obtained by the addition to the above-described fluid of a mixture of small quantities of nitrate of magnesium, oxid of antimony, (dissolved in water containing tartaric acid,) chromic acid, vanadate of ammonia, molybdate of ammonia, uranium nitrate, and, if desired, nitrate of silver.

A more greenish-yellow light is obtained by the addition of magnesium nitrate, oxid of antimony, uranium nitrate, molybdate of ammonia, chromic acid, and, if desired, nitrate of silver.

A reddish-yellow light is produced by the addition of chromic acid, platinum chlorid, wolframate of ammonia, vanadate of ammonia, magnesium nitrate, uranium nitrate, oxid of antimony, and, if desired, nitrate of silver.

What I claim is—

1. The herein-described method of manufacturing a fluid for impregnating fibers, fabrics, or bodies to be used for incandescent lighting, which method consists in combining oxids of strontium, zirconium, barium and aluminium and dissolving the same, substantially as hereinbefore described.

2. The herein-described method of manufacturing a fluid for the purpose above specified, which method consists in combining oxids of strontium, zirconium, barium and aluminium, dissolving the same, and adding thereto small quantities of soluble metallic compounds which, when ignited, produce light-giving metallic oxids, or metals, substantially as hereinbefore described.

3. A fluid for the purpose above specified, composed of a solution of oxids of strontium, zirconium, barium and aluminium, substantially as described.

4. A fluid for the purpose above specified, composed of a solution of oxids of strontium, zirconium, barium and aluminium and a small quantity of dissolved metallic compounds which, when ignited will produce light-giving metallic oxids, substantially as described.

5. A fluid for the purpose above specified, composed of a solution of oxids of strontium, zirconium, barium and aluminium and small quantities of magnesium nitrate, oxid of antimony, uranium nitrate, an ammonium compound adapted to impart a desired color to the light, and chromic acid, substantially as described.

6. A fluid for the purpose above specified, composed of a solution of oxids of strontium, zirconium, barium and aluminium and small quantities of magnesium nitrate, oxid of antimony, uranium nitrate, wolframate of ammonia, vanadate of ammonia and chromic acid, substantially as described.

7. A fluid for the purpose above specified, composed of a solution of oxids of strontium, zirconium, barium and aluminium and small quantities of magnesium nitrate, oxid of antimony dissolved in water containing tartaric acid, uranium nitrate, wolframate of ammonia, vanadate of ammonia, chromic acid, and nitrate of silver, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GERHARD BODO PUCHMÜLLER.

Witnesses:

GOTTLIEB SAMUEL HENRY THÜHER,
ERNST LAPPERT.