UNITED STATES PATENT OFFICE.

HENRY HASWELL HEAD, OF DUBLIN, AND LLEWELLYN SAUNDERSON, OF KINGSTOWN, COUNTY OF DUBLIN, IRELAND; SAID HEAD ASSIGNOR TO SAID SAUNDERSON.

CARBON FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 422,302, dated February 25, 1890.

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To all whom it may concern:

Be it known that we, HENRY HASWELL HEAD, residing at 17 Fitz William Square, Dublin, Ireland, and LLEWELLYN SAUNDERSON, residing at 10 De Vesci Terrace, Kingstown, county Dublin, Ireland, subjects of the Queen of Great Britain, jointly have invented certain new and useful Improvements in the Manufacture of Carbons for Electric Lamps, of which the following is a specification.

Our invention relates especially to improvements of the composition of the carbons for the purpose of improving the color of the light emitted therefrom.

In order to carry out our invention, we manufacture the carbons from a mixture of powdered gas-coke, coking-coal, an infusible or difficultly-fusible material, and a material to vary the color of the light, and heat the mixture under pressure in a mold.

The subject-matter of our invention is specifically designated in the claims at the end of this specification.

The manner of manufacturing the carbons is as follows: In order to make a compact coke difficult to burn, powdered gas-coke is mixed with powdered coking-coal in the proportion of coke varying from eighty per cent. to fifty per cent., the coal varying from twenty per cent. to fifty per cent. To this mixture is added one per cent. to ten per cent. of one of the following infusible or difficultly-fusible substances—namely, glass, silica, cyanite, kaolin, bauxite, asbestus, pumice, feldspar, gadolinite, samarskite, zircon, limestone, dolomite, witherite, phosphate of lime, strontianite, braunite, titanic iron, chrome iron ore, wolfram, molybdenite, fluor-spar, cerite, cryolite, phosphate of aluminum, magnesite, or compounds of nickel and cobalt. This mixture forms the groundwork of the carbon, and these substances are used in order to make the impurities in the above-named mixture difficult to fuse, and hence increase the intensity and steadiness of the light. To the above-mentioned mixture is then added one per cent. to twenty per cent. of one of the following bodies or mixtures thereof—namely, sodium, lithium, strontium, calcium, copper, thallium, barium, indium, lead, boron, cæsium, rubidium, potassium, or any of their salts, according to the light required. The whole, after careful mixing, is introduced into an iron mold and heated under pressure, first gently, but finally very strongly. The carbon rods so made, if found too porous, are heated and introduced into hot coal-tar, and the whole heated for some time, preferably in a vacuum. The carbon rod is then taken out and its surface cleaned. It is then introduced into another mold and again heated under pressure. These operations are repeated until the required density is obtained.

For some purposes, in order to render the effect more satisfactory, the outer portion of the carbon rod should contain no fusible coloring-bodies. When this is the case, hollow carbon rods are made from the mixture of coke, coal, and refractory substances other than the coloring materials by introducing the mixture into proper molds and treating under pressure, as hereinbefore described. The hollow carbon so made is then filled with a mixture of from thirty to fifty parts of powdered anthracite or coke, ten to twenty parts of powdered coal, and one to twenty parts of calp limestone, or one of the above-named refractory bodies and one to twenty parts of one of the above-named salts or a mixture thereof. The carbons are then again heated as before.

We are aware that it has been proposed to make electric-light carbons of powdered coke, coal, and a difficultly-fusible material, and do not broadly claim such a carbon.

We are also aware that a carbon pencil consisting of a metallic tube covered with pure carbon and inclosing material for coloring or increasing the light is old; but, so far as we are aware, we are the first to use carbons combining integrally coke, coal, a refractory non-coloring material, and a coloring material, and also the first to use a hollow carbon composed integrally and entirely of the three first-named ingredients with material for coloring the light inclosed therein.

What we claim as new and as of our own invention is—

1. The herein-described carbon pencil for electric lights, made from a compressed mixture of from eighty per cent. to fifty per cent.

of powdered gas-coke, from twenty per cent. to fifty per cent. of powdered coal, from one per cent. to ten per cent. of refractory material, and from one per cent. to twenty per cent. of coloring-matter.

2. The herein-described carbon pencil for electric lights, made from a compressed mixture of from eighty per cent. to fifty per cent. of powdered gas-coke, from twenty per cent. to fifty per cent. of powdered coal, from one per cent. to ten per cent. of refractory material, from one per cent. to twenty per cent. of coloring-matter, all intimately mixed, and coal-tar applied to and impregnating the surface of the carbon.

3. The herein-described carbon pencil for electric lights, consisting of a hollow or tubular rod made from a compressed mixture of from eighty per cent. to fifty per cent. of powdered gas-coke, from twenty per cent. to fifty per cent. of powdered coal, and from one per cent. to ten per cent. of refractory material, and filled with a mixture of from thirty to fifty parts of anthracite, ten to twenty parts of powdered coal, one to twenty parts of refractory material, and one to twenty parts of coloring-matter.

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