

# UNITED STATES PATENT OFFICE.

WILLIAM H. BALMAIN, OF EVERSLEY, VENTNOR, COUNTY OF HANTS, ISLE OF WIGHT, ENGLAND; HARRIET FOX, EXECUTRIX OF SAID WILLIAM H. BALMAIN, DECEASED.

## SELF-LUMINOUS PAINT.

SPECIFICATION forming part of Letters Patent No. 264,918, dated September 26, 1882.

Application filed November 20, 1878. Patented in England November 7, 1877, No. 4,152; in Victoria December 31, 1879, No. 2,766; in Italy December 31, 1880, XXV, 131; in Belgium January 3, 1881, No. 53,483; in Tasmania March 21, 1881, No. 192; in New Zealand April 23, 1881, No. 523; in Spain May 21, 1881, No. 1,455; in Sweden June 18, 1881; in New South Wales June 25, 1881, No. 947; in Queensland July 12, 1881, No. 354; in Portugal July 21, 1881, No. 688; and in Austria December 7, 1881, No. 33,137.

### *To all whom it may concern:*

Be it known that I, WILLIAM HENRY BALMAIN, of Eversley, Ventnor, Isle of Wight, in the county of Hants, England, have invented certain Improvements in Painting, Varnishing, and Whitewashing, of which the following is a specification.

The said invention consists in a luminous paint, the body of which is a phosphorescent compound or is composed in part of such a compound, and the vehicle of which is such as is used as the vehicle in ordinary paint compounds—viz., one which becomes dry by evaporation or oxidation.

The object or article to which such paint or varnish or wash is applied is itself rendered visible in the darkest place and more or less capable of imparting light to other objects, so as to render them visible also. The phosphorescent substance found most suitable for the purpose is a compound obtained by simply heating together a mixture of lime and sulphur or carbonate of lime and sulphur, or some of the various substances containing in themselves both lime and sulphur—such, for example, as alabaster, gypsum, and the like—with carbon or other agent to remove a portion of the oxygen contained in them, or by heating lime or carbonate of lime in a gas or vapor containing sulphur.

The vehicle to be used for the luminous paint must be one which will dry by evaporation or oxidation, in order that the paint may not become soft or fluid by heat or be liable to be easily rubbed off by accident or use from the articles to which it has been applied. It may be any of the vehicles commonly used in oil-painting or any of those commonly used in what is known as "distemper" painting or whitewashing, according to the place or purpose in or for which the paint is to be used.

It is found the best results are obtained by mixing the phosphorescent substance with a colorless varnish made with mastic or other resinous body and turpentine or spirit, making the paint as thick as convenient to apply with a brush and with as much turpentine or spirit

as can be added without impairing the required thickness. Good results may, however, be obtained with drying-oils, spirit-varnishes, gums, pastes, sizes, and gelatine solutions of every description, the choice being varied to meet the object in view or the nature of the article in hand.

The mode of applying the paint, varnish, or wash will also depend upon the circumstances of the case. For example, it may be applied by a brush, as in ordinary painting, or by dipping or steeping the article in the paint, varnish, or wash; or a block or type may be used to advantage, as in calico-printing and the like. For outdoor work, or wherever the surface illuminated is exposed to the vicissitudes of weather or to injury from mechanical contingencies, it is desirable to cover it with glass, or, if the article will admit of it, to glaze it over with a flux, as in enameling, or as in ordinary pottery, and this may be accomplished without injury to the effect, even when the flux or glaze requires a red heat for fusion.

Among other applications of the said invention which may be enumerated, it is particularly advantageous for rendering visible clock or watch faces and other indicators—such, for example, as compasses and the scales of barometers or thermometers—during the night or in dark places during the night time. In applying the invention to these and other like purposes there may be used either phosphorescent grounds with dark figures or dark grounds and phosphorescent figures or letters, preferring the former. In like manner there may be produced figures and letters for use on house-doors and ends of streets, wherever it is not convenient or economical to have external source of light, sign-posts, and signals, and names or marks to show entries to avenues or gates, and the like.

The invention is also applicable to the illumination of railway-carriages by painting with phosphorescent paint a portion of the interior, thus obviating the necessity for the expense and inconvenience of the use of lamps in passing through tunnels. It may also be applied

exterpally as warning-lights at the front and  
end of trains passing through tunnels, and in  
other similar cases, also to ordinary carriages,  
either internally or externally. As a night light  
5 in a bed-room or in a room habitually dark  
the application has been found quite effectual,  
a very small proportion of the surface rendered  
phosphorescent affording sufficient light for  
moving about the room or for fixing upon and  
10 selecting an article in the midst of a number  
of complicated scientific instruments or other  
objects.

The invention may also be applied to pri-  
vate and public buildings in cases where it  
15 would be economical and advantageous to  
maintain for a short time a waning or twi light,  
so as to obviate the necessity for lighting ear-  
lier the gas or other artificial light. It may  
also be used in powder-mills and stores of pow-  
20 der, and in other cases where combustion or  
heat would be a constant source of danger, and  
generally for all purposes of artificial light  
where it is applicable.

In order to produce and maintain the phos-  
25 phorescent light, full sunshine is not necessary,  
but, on the contrary, is undesirable. The illu-  
mination is best started by leaving the article  
or surface exposed for a short time to ordinary  
daylight or even artificial light, which need  
3 not be strong in order to make the illumina-  
tion continue for many hours, even twenty  
hours, without the necessity of renewed expo-  
sure.

The advantages of the invention consist in  
obtaining for the purposes of daily life a light 35  
which is maintained at no cost whatever, is  
free from the defects and contingent dangers  
arising from combustion or heat, and can be  
applied in many cases where all other sources  
of light would be inconvenient or incapable of 40  
application.

Heretofore phosphorus has been mixed with  
earthy oxides, carbonates, and sulphates, and  
with oxides and carbonates of metal, as tin,  
zinc, magnesia, antimony, and chlorides of 45  
the same, also crystallized acids and salts and  
mineral substances, and same have been in-  
closed and exhibited in closely-stopped bottles  
as a phosphorus; but such union I do not  
claim; but 50

What I claim is—

A luminous paint the body of which is a  
phosphorescent substance or composed in part  
of such substance, the vehicle of which is such  
as is ordinarily used in paints—viz., one which 55  
will become dry by oxidation or evaporation—  
substantially as herein described.

W. H. BALMAIN.

Witnesses:

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JAMES HINES,  
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