

# UNITED STATES PATENT OFFICE.

GEORGE MCKENZIE, OF GLASGOW, GREAT BRITAIN.

## IMPROVEMENT IN THE MANUFACTURE OF ILLUMINATING-GAS.

Specification forming part of Letters Patent No. 66,511, dated July 9, 1867.

*To all whom it may concern:*

Be it known that I, GEORGE MCKENZIE, of Glasgow, in the county of Lanark, Kingdom of Great Britain and Ireland, have invented a new, useful, and Improved Compound for obtaining Illuminating-Gas; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a new compound or combination of substances for obtaining illuminating-gas; and it consists in combining coal with shale-oil or other mineral oil.

And in order that others skilled in the art may be enabled to understand and use my invention, I proceed to particularly describe the manner of performing the same, premising that by the term "coal" I denote the various kinds frequently termed "bituminous" coals; but I do not include under it the mineral "lignite," which is sometimes called "brown coal," nor the mineral "anthracite," while I may remark that it will probably not be found economically advantageous to employ the varieties hitherto commonly used as "gas"-coal, (except, perhaps, mixed with superior coal,) in working my invention.

In practically carrying out my invention for the purpose of obtaining illuminating-gas in the manner which I at present believe to yield the best results, but to the precise details of which I by no means restrict myself, I combine the oil and coal in the proportion of thirty gallons of oil to one ton of coal.

I prefer to have the oil and coal as free from water as possible, and I prefer either to take coal already existing in a pulverized state, or as separated by riddling or sifting, or to reduce the coal to a pulverized state by grinding.

I combine the oil and coal by intimately mixing the oil with the pulverized coal in any convenient way, preferring to make the combination with the oil, or both oil and coal in a heated state. It is not essential, however, that either oil or coal should be heated when being mixed.

The mixing may be effected in a mixing or grinding mill, such as is used in grinding mortar or loam.

I do not restrict myself to any particular kind of mineral oil, but I prefer to take crude shale-oil or petroleum, and if such oil as purchased or as manufactured for the purposes of my invention contains volatile oils or water, I prefer to remove these by distilling

them off or otherwise before combining the oil with the coal. When the oil is heated for such a purpose—that is to say, for removing the volatile oil and water—then I at once combine it with the coal without allowing it to cool.

In some cases the residues, known as "residues" and "bottoms," obtained in treating crude shale-oil or petroleum in the existing processes of manufacture, and which are left in the stills after distilling off the "light" and "lubricating" oils, may be mixed with the crude oil employed in carrying out my invention, with the view of reducing the aggregate cost of the raw materials.

My improved gas compound, prepared in the manner hereinbefore described, is treated for the obtainment of illuminating-gas, precisely like the ordinary gas-coal used for that purpose—that is to say, it is put into gas-retorts of iron or fire-clay, such as are at present in use, and the distillation or decomposition is effected in the ordinary way, it being necessary to remark in connection therewith merely that it is advantageous to employ a strong heat, never less than a bright red heat, but a white heat, or nearly so. A carbonaceous residue or coke is left in the retort, as with ordinary gas-coal, and, being of good quality will, by its use or sale, reduce the cost of the illuminating-gas.

Although I believe the proportions of the ingredients and the manner of preparing my improved gas compound hereinbefore detailed to be the most suitable in practice, I do not restrict myself thereto, as they may be varied within reasonable limits, according to the quality of the oil and coal, and also to the quantity and quality of the gas that it is wished to produce; but

What I claim as my invention, and desire to secure by Letters Patent, is—

The combining of pulverized coal and mineral oil, to form a compound, to be used for obtaining illuminating-gas, substantially as hereinbefore described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE MCKENZIE.

EDMOND HUNT,  
*Patent Agent, Glasgow.*  
WILLIAM CRAWFORD,  
*Draftsman.*