

UNITED STATES PATENT OFFICE.

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COMPOSITION OF MATTER.

1,003,147.

Specification of Letters Patent.

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To all whom it may concern:

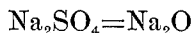
Be it known that I, WILLIAM H. MURRAY, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Compositions of Matter, of which the following is a specification.

My invention relates to a composition of matter designed for use with fine coal, slack, etc., and particularly the bituminous coals which have the property of throwing off great volumes of dense or black smoke carrying particles of carbon in the form of soot which finally settle upon buildings, clothes, etc., to the great annoyance to the owners and permanent damage to the structure.

The essential object of the invention is to mechanically combine with the aforesaid coals a chemical composition which has the property of promoting combustion of the coal to such an extent as to practically insure the elimination of free carbon, and thereby prevent the generation of the dense or black smoke resulting from soft or bituminous coals, the smoke arising from the combustion of the fuel impregnated with my composition being generally of a gray color and quickly dissipating when discharged into the open air.

In practicing my invention I have endeavored to discover some effective and cheap substance suitable to attain the desired result, namely, the material reduction and almost complete elimination of the dense black smoke and the reduction of gases arising from the incomplete combustion of soft coal, thereby minimizing the inconveniences and damage flowing from the use of such coal and the discharge of the products thereof from stacks and chimneys, into the open air, and I have found, after extensive experiment, that the by-product known as "salt cake" and heretofore regarded largely as the waste arising from acid works, was most effective, when mixed with soft coal, in reducing to a minimum the objectionable dense black smoke arising from the use of such coal.

"Salt-cake" (sodium sulfate),



(sodium oxid) 43.66 has heretofore largely been regarded as a waste from acid works and is therefore comparatively inexpensive;

when used alone with soft coal there was a marked depreciation of dense black smoke emitted, but the best results have been obtained when the "salt cake" was mixed with calcium hydroxid (freshly slaked lime), in about the proportion of seven (7) parts of "salt cake" to three (3) parts of lime, the two substances being pulverized or ground to form substantially a powder and intimately mixed. Being in a dry and ground condition, the composition may be readily packaged and is ready for use whenever the occasion requires. This combined dry substance is mixed with the soft coal by sprinkling it over the latter, the proportion of material used being about one-half ($\frac{1}{2}$) pound of the compound to say fifteen (15) pounds of coal, and when the fuel is fed into the fire-box of the furnace or stove, the chemicals named seem to have the property of fluxing or neutralizing the gases arising from combustion to such an extent that the smoke emitted from the stack or chimney will be gray in color, instead of dense or black, and will readily dissipate and disappear entirely after traveling a comparatively short distance from the stack.

If desired the coal may be sprayed with water, and the dry or powdered composition if blown or sprinkled thereon will readily adhere to the moistened coal and form somewhat of a coating therefor.

It is not known just what chemical change occurs when my composition of matter is operating in contact with the fire and is consumed in the presence of the soft coal, and efforts on my part to ascertain from skilled chemists the change which takes place in the furnace have been unavailing. The fact remains however that extensive experiments made by me show that there is a more perfect combustion by the substance evolving oxygen when heated, or from some other cause unknown to me, and the diminution in the amount of black smoke which is discharged from the stack. When using coal to which my compound has been added and the coal burned under conditions exactly similar to those existing when using the same coal without the compound, little or no smoke was observed and whatever smoke there was it was of a thin character and without the dense black and evident escape of carbon shown in the tests in which the compound was not used; there was also a

material reduction in the smoke clouds when using my compound, the reduction in many instances exceeding fifty per cent.

Among the advantages of my composition as shown by recent exhaustive tests are the following:—1st. The consumption of black smoke and soot, and the clearing of the stack within two (2) minutes. 2nd. A reduction in fuel bills of about 25%. 3rd. A gain in extra steam of about 20 to 30%. 4th. As no steam jet is required I save the heat energy, to produce the steam, estimated at from 80 cents to one dollar per day or a saving of 1/10 fuel bill. 5th. There was less firing required, therefore there was a saving in labor. 6th. There was an absence of objectionable clinkers. 7th. There was no damaging effects, no corrosion to iron or steel tubes. 8th. The volume of black smoke arising from soft coal unmixed with my compound was found to travel about 750 feet from the stack, while the travel of the light brown or gray smoke emitted from soft coal mixed with my compound was reduced to about 50 feet. 9th. The tests show that the shades of smoke were—after the first 1/8th minute the smoke was brown; the next 1/8 minute the smoke was light brown; the next 1/8 minute the smoke was gray; the next 1/8 minute the smoke was light gray; then the stack cleared.

It will thus be seen that by the use of a comparatively inexpensive substance I ob-

tain a saving in fuel, steam, and labor, and I effect a more perfect combustion and a neutralizing of the gases ordinarily resulting from combustion and almost completely eliminate from the escaping products of combustion the objectionable and deleterious or injurious substances, which are so common in the burning of soft coal as to call for the enactment of stringent laws in many communities.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is—

The powdered composition of matter herein described consisting of two ingredients, namely, sodium sulfate and calcium hydroxid, both in a ground condition and the two being mixed and the proportion of the oxid of calcium being at least one-third of that of the sodium sulfate, the said ingredients being used in a dry form and designed to be sprinkled on the fuel previous to and during the introduction of said fuel into the furnace, whereby the mixture is subjected to the temperature of combustion taking place within the furnace.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. MURRAY.

Witnesses:

GEORGE DOBBS,
W. C. DOBBS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."