UNITED STATES PATENT OFFICE.

JOHN P. JONES, OF GOLD HILL, NEVADA.

COMPOUND HYDROCARBON FUEL.

SPECIFICATION forming part of Letters Patent No. 246,614, dated September 6, 1881.

Application filed March 12, 1881. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN P. JONES, of Gold Hill, in the county of Storey and State of Nevada, have invented a new and useful improvement which relates to the production of fuel suitable for use in steam-boiler furnaces, ranges, and domestic fire-places; and said improvement specially consists in the formation of a composition of matter for producing and sustaining full and perfect combustion of the whole of the carbon contained in said fuel, whereby the greatest amount of heat and flame capable of being produced by the chemical union of the elements entering into said composition is developed; and I do hereby declare that the following is a full, clear, and exact description of the composition and mode of use of this my said improvement.

It has been long admitted that the combustion of fuel in furnaces and boilers has been very imperfect and incomplete, that economy in fuel has been sacrificed, and needless expense in the production of heat increased. To remedy these defects, solid fuel, such as coal, has been reduced to powder and delivered or blown into the furnace, and air and steam, both open and superheated, have been employed as accessories to the ordinary supply of air through the ash-pit; and, further, that fuel in the liquid form, as hydrocarbon oils, petroleum, and its products, has been employed by means of various devices and apparatus; but none of these attempts have been found as yet wholly successful in effecting the complete combustion of the carbon of the fuel, and hence the full combustion value of fuel has not yet been attained; and hence the combustion of coal or other carbonaceous fuel in stationary furnaces and in steam-boilers, by the production of smoke, has become a nuisance in those neighborhoods where the industrial processes requiring steam-power or furnacing are carried on.

These objections are nearly if not wholly obviated by the use of the compound which forms the subject of this specification, which consists in the combination of a hydrocarbon-liquid fuel, such as petroleum or any of its derivatives, compounds, or distillates, with a pulverulent solid material, whether of mineral or of organic nature. These substances are so combined as to produce a solid body, in the form of a light powder, whose particles are so finely comminuted as to move or glide easily among themselves, so as to flow readily, like fine sand, and thus to produce a fuel which may be fed or blown into furnaces, stoves, and other fire-places with the greatest ease and to any amount desirable.

The manner of making this compound is as follows: I take any given quantity—for instance, one thousand pounds—of the solid element of the fuel, which may be any finely-powdered solid of such chemical composition as will, when heated up to 800° or 1,000° of Fahrenheit's thermometer, either undergo decomposition and yield gaseous products which in themselves are capable of supplying heat by convection to the body of the furnace, or to the walls of the steam-boiler or other suitable surfaces, or if not so then that such substances when so heated up are capable of becoming luminous and of developing heat by radiation, and thus by incandescence produce the most perfect combustion of the liquid with which it is combined.

I preferably employ that form of silicious earth known as "infusorial earth," kieselguhr, or fossil diatom clay-rock, which has the properties of lightness, porosity, and consequent capacity of absorbing liquids so necessary for the proper preparation of this compound. I place this infusorial earth in a large vat or suitable containing-vessel, having previously reduced it to fine powder, if it be not by nature finely divided. It is necessary that it be in an impalpable powder, and hence it is not always necessary that it be ground. The liquid hydrocarbon, such as petroleum, which I preferably employ, is then poured over, in the form of a fine spray or in atomized condition, the silica in the vat in sufficient quantity, or until the whole mass of earth is fully saturated and has absorbed its full quota of liquid, yet not so much as to leave any excess of hydrocarbon, so as to cause any portion of the liquid to accumulate in the lower part of the vessel in which the compound is formed. Usually some time elapses before the solid powder has absorbed its full complement of liquid, and this object can be accomplished by agitation of the

compound, either by hand or machinery, so that each portion of the solid in powder may have its pores or cavities filled with the hydrocarbon.

I find by experiment that about one-fourth of the weight of the powder is the suitable amount of liquid hydrocarbon required to be added, or about two hundred and fifty pounds of petroleum to the amount of silicious earth before stated. When about these proportions have been used and the mixture properly effected the pulverulent hydrocarbon fuel should present the following characteristics: It is in the form of a light powder, which does not readily moisten the hand on which it is laid; nor on pressure does it allow of any portion of the liquid being squeezed out. Its particles move easily over each other, and can be delivered down an inclined plane, like any light dry powder.

When the fuel is not needed to be used at the time of manufacture it should be stored in boxes, bins, or air-tight vessels in a cool situation, as well for safety as for preservation of the strength of the compound.

In making this article I do not confine myself to the use of the infusorial silica before mentioned. Any other mineral substance possessing the desired properties of absorbing liquids or of becoming incandescent will answer equally well, and may at times be preferred. Thus asbestus or other fibrous silicious substance may be used, or I may select the caustic earths, as lime or magnesia, or their carbonates, which at times may answer equally well. Nor do I confine myself in the use of powdered solid bodies to mineral substances only, since organic bodies, as coal or coke in fine powder, sawdust, or other vegetable substance yielding carbon and hydrogen when ignited, may, for certain conditions of applying heat, answer equally well, since the object of this invention is a fuel compound in which a liquid hydrocarbon is retained by and within the mass of solid powder by capillarity or adhesion to its surfaces or pores.

The manner in which I preferably use the fuel thus prepared is to deliver it into the furnace or fire-box in a fine stream, as fed by a hopper or by a horizontal screw arrangement, through pipes at a point where it is met by a blast of air or by air and steam in proper proportions, and with such force that the whole of the carbon and hydrogen of the fuel may meet with a due supply of atmospheric oxygen, whereby they may be completely and quickly converted into carbonic acid and vapor of water, leaving no unconsumed carbon either to be deposited or to escape as smoke.

I am aware that solid fuel has been used in a pulverized form, and also that liquid hydrocarbons have been used in furnaces as fuel, either fed in alone by spray or otherwise in liquid form, and also that such combustion has been aided by air or steam jets, or both; but such I do not claim, not being of the nature of my invention; but

What I do claim, and desire to secure by Letters Patent, is—

1. As a new manufacture, a pulverulent solid fuel consisting of a light pulverized solid impregnated with petroleum or other liquid hydrocarbon, and having the essential properties herein described.

2. A pulverulent solid fuel compound composed of infusorial silicious earth united with petroleum or other liquid hydrocarbon, as herein set forth.

This specification signed and witnessed this 12th day of March, 1881.

JNO. P. JONES.

Witnesses:
W. E. CHAFFEE,
H. C. HUNTEMANN.