

(No Model.)

J. F. DUKE.

MANUFACTURE OF SELF IGNITING GAS MEDIUMS.

No. 554,249.

Patented Feb. 11, 1896.

Fig. 1.

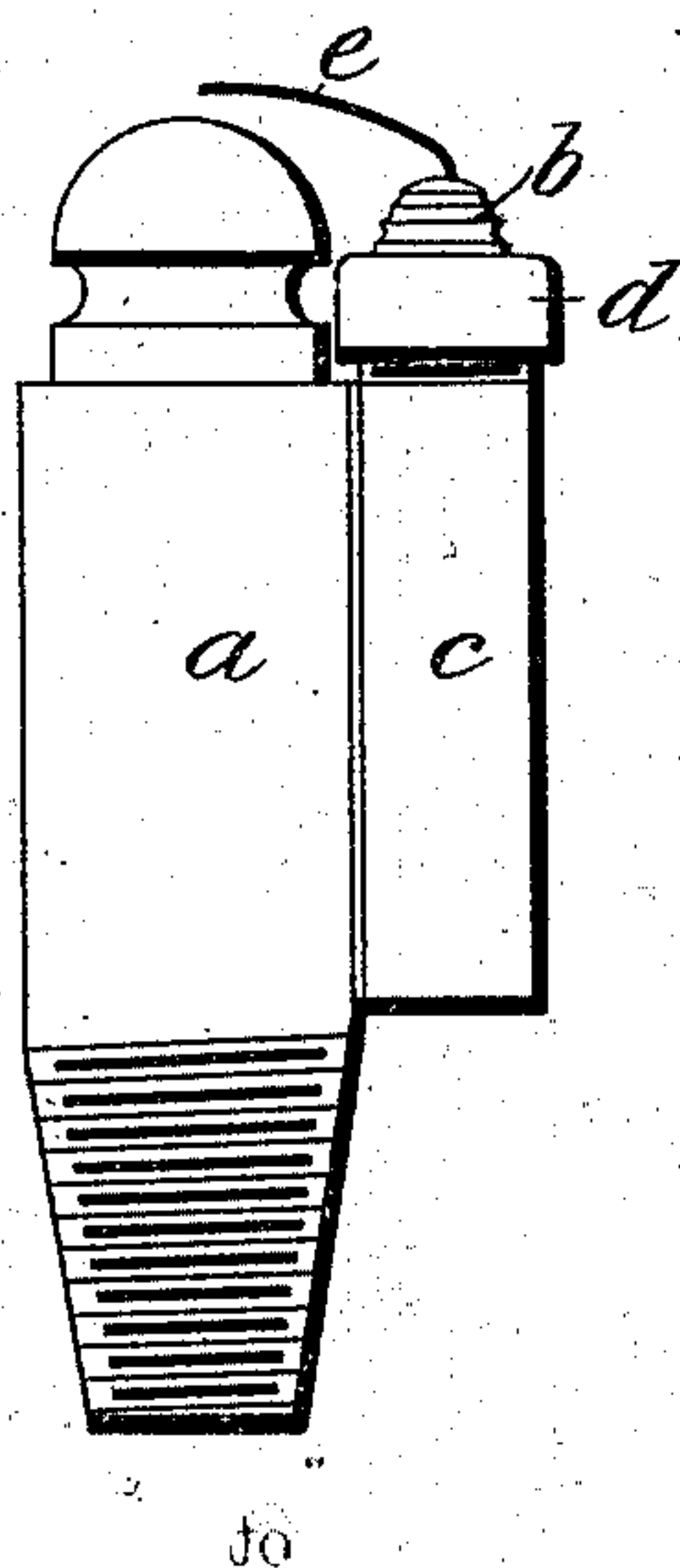


Fig. 2.

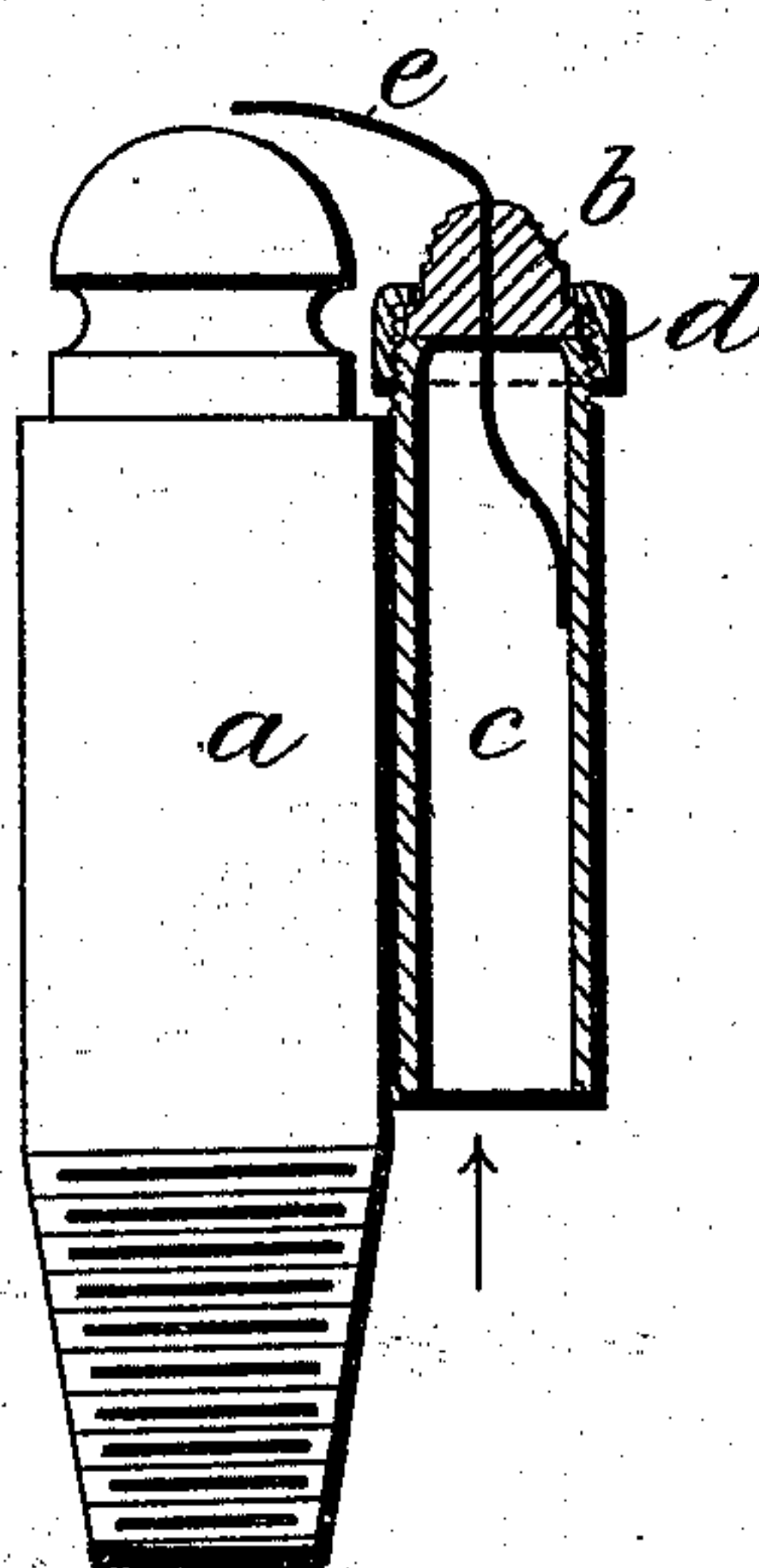
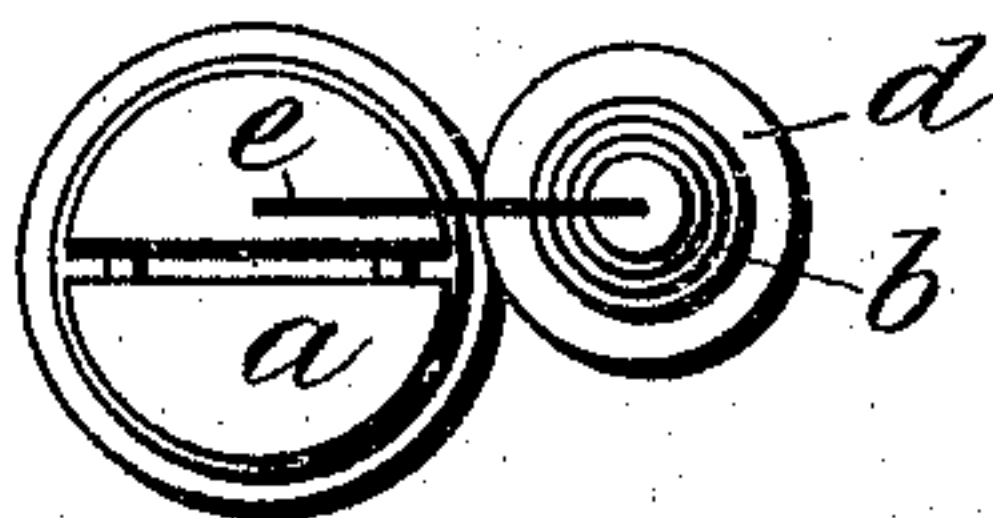


Fig. 3.



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*Born*

# UNITED STATES PATENT OFFICE.

JOHN FREDERICK DUKE, OF LONDON, ENGLAND.

## MANUFACTURE OF SELF-IGNITING GAS MEDIUMS.

SPECIFICATION forming part of Letters Patent No. 554,249, dated February 11, 1896.

Application filed May 27, 1895. Serial No. 550,778. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN FREDERICK DUKE, of London, England, have invented certain new and useful Improvements in the Manufacture of Mediums for Igniting Gas by its Own Action, of which the following is a specification.

This invention has reference to mediums whereby ordinary coal-gas, (alone or mixed with air,) or other gas containing hydrogen, can be ignited by its own action.

It is well known that platinum-black or spongy platinum will occlude a large quantity of oxygen from the air, and that if a stream of hydrogen be directed upon the platinum the chemical combination of the two gases takes place with sufficient energy to raise the temperature of the platinum. Attempts have already been made to take advantage of this property of platinum by applying it to the automatic ignition of lighting coal-gas. In these attempts the gas issuing from an ordinary burner has been caused to blow upon the platinum contained in a receptacle so as to warm this platinum sufficiently to render incandescent a fine wire of platinum carried from the platinum in the receptacle to a position where it comes into contact with the gas as it issues from the burner. This wire on becoming incandescent ignites the gas. None of these attempts has proved a practical success.

I have found by experiment that metallic platinum in the very-finely-divided form known as "platinum-black" or "platinum-mohr" is the only form of platinum that will cause the combination of the coal-gas with its occluded oxygen at the ordinary temperature with sufficient energy to produce a red heat or heat sufficient to render incandescent a length of platinum wire when a current of cold carbureted hydrogen or ordinary illuminating-gas plays upon it. I have also found that after a time the particles or atoms of the platinum-black coalesce because the heat communicated to them by the flame and by their own act of occlusion combined with the free access of the oxygen in the air tend to decarbonize or fuse the platinum-black. When the particles have more or less coalesced they are not in a finely-enough-divided condition to bring about the combina-

tion of the coal-gas with the oxygen of the air, at the ordinary temperature, with sufficient rapidity to render the wire incandescent when a stream of cold carbureted hydrogen is passed over or along it.

Now this invention consists in the employment, for the purpose of automatically igniting gas in the manner above referred to, of a block of porous material of fine porosity in the pores of which platinum-black is contained, so that the particles or atoms of platinum-black are so finely divided as to be effectually prevented from coalescing.

The invention also comprises the method or process of getting particles or atoms of platinum-black into the pores of the block.

For the purpose of my invention I take a strong or concentrated solution of a platinum-salt that is soluble in water, and I immerse therein a block or piece of a suitable porous material, so that the block may absorb some of the solution. I find meerschaum eminently adapted for the purpose. I subject the meerschaum or other material containing the platinum-salt in its pores to the action of a substance which by causing a chemical reaction will reduce the platinum-salt to the metallic state without having any chemical action on the material of which the block is composed, the metallic platinum remaining in the pores in so finely divided a form as to constitute platinum-black.

In carrying out my invention I preferably use a solution of bichloride of platinum, preferably of five cubic centimeters of water to one ounce of the platinum bichloride, or a weaker solution may be used with repeated immersions and drying. After the meerschaum has absorbed into its pores as much of it as it can take up I subject the meerschaum to the action of carbureted hydrogen, taking care to exclude the atmospheric air, the carbureted hydrogen being preferably dry, gaseous and heated to a sufficient temperature (say about 150° centigrade) to cause its hydrogen to combine with the chlorine of the platinum bichloride and form hydrochloric-acid gas. The platinum is thus reduced within the pores of the meerschaum to the metallic state known as "platinum-black" or "platinum-mohr." The action of the carbureted hydrogen should be continued



until hydrochloric-acid gas ceases to be evolved.

The accompanying drawings show by way of example and on an enlarged scale how a gas-burner may be fitted with a porous block containing platinum-black, as hereinbefore described, so that when the tap is turned on the gas becomes ignited by its own action in the manner set forth.

Figure 1 is an elevation of the burner and of the porous block and its holder attached to the burner. Fig. 2 is a similar view, but with the block and its holder in section; and Fig. 3 is a plan.

*a* is the burner.

*b* is the block of porous material.

*c* is a tube attached to one side of the burner *a*. The block rests upon the upper end of this tube and is secured by the screw-cap *d*, the tube *c* and cap *d* together constituting the block-holder.

*e* is the platinum wire fixed at one end to the inside of the tube *c*. It passes through the block *b*, and its other end is carried above the burner to the position seen in Fig. 3—that is to say, just where the gas and air mix.

The block *b* is shown as formed with external furrows. These are for the purpose of offering more surface to the stream of gas.

The shape of the block and the means of holding it in position may obviously be considerably modified.

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

1. As a new article of manufacture, a medium for igniting gas by its own action in the manner set forth, said medium consisting of a block of porous material of exceedingly fine porosity having in its pores platinum in the state of platinum-black, whereby the latter is held in so finely divided a condition that its particles are prevented from coalescing.

2. As a new article of manufacture, a medium for igniting gas by its own action in the manner set forth, said medium consisting of a block of meerscham having in its pores platinum in the state of platinum-black, as distinguished from platinum in an ordinary metallic state.

3. As a new article of manufacture, an automatic gas-lighter comprising a block of porous material having platinum-black within its pores, means holding said block relatively to a gas-tap, and an incandescing wire extending from said block in position to ignite the gas flowing from a tap to which the igniter may be connected, whereby when a stream of gas strikes said block said wire will be heated and can ignite the gas.

4. In an automatic gas-lighter, the holder adapted for connection to a gas-burner, in combination with a block of meerscham having platinum-black within its pores, and a wire heated by said block when a stream of gas contacts with the latter, and then adapted to ignite such gas, substantially as and for the purpose set forth.

5. The process of manufacturing a medium for igniting gas by its own action, which process consists in absorbing a concentrated solution of a platinum-salt in the pores of a porous material, and then reducing the platinum-salt, while in the pores of said material, to the metallic state in a finely-divided form, as platinum-black, substantially as set forth.

6. The process of manufacturing a medium for igniting gas by its own action, which process consists in absorbing a strong solution of a platinum-salt in the pores of a block of meerscham, and then reducing the platinum-salt so absorbed to the metallic state within the pores of the material in a finely-divided form as platinum-black, substantially as set forth.

7. The process of manufacturing a medium for igniting gas by its own action, which consists in absorbing a strong solution of bichloride of platinum in the pores of a porous material of very fine porosity and then reducing said bichloride of platinum to the metallic state, within the pores of said material, in so finely divided a form as to constitute platinum-black, by subjecting said material to the action of dry carburated hydrogen, substantially as hereinbefore described.

8. The process of manufacturing a medium for igniting gas by its own action, which consists in absorbing a solution of bichloride of platinum in the pores of a block of meerscham, and then reducing said bichloride of platinum to the metallic state within the pores of said material, in so finely divided a form as to constitute platinum-black, by subjecting said block to the action of gaseous carburated hydrogen, substantially as hereinbefore described.

9. The improved process of manufacturing a medium for igniting gas by its own action, which process consists in absorbing a solution of a platinum-salt in the pores of a block of porous material of fine porosity, and then reducing said salt to platinum-black within the pores of said material by subjecting said block to the action of a heated carburated hydrogen, substantially as and for the purpose set forth.

10. The improved process of manufacturing a medium for igniting gas by its own action, which process consists in absorbing a solution of a platinum-salt in the pores of a block of porous material, then drying such solution in said pores, and then reducing said salt in said pores to platinum-black by treating said block with a substance capable of effecting such reduction, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN FREDERICK DUKE.

Witnesses:

JOHN C. MEWBURN,  
GEORGE C. BACON.