

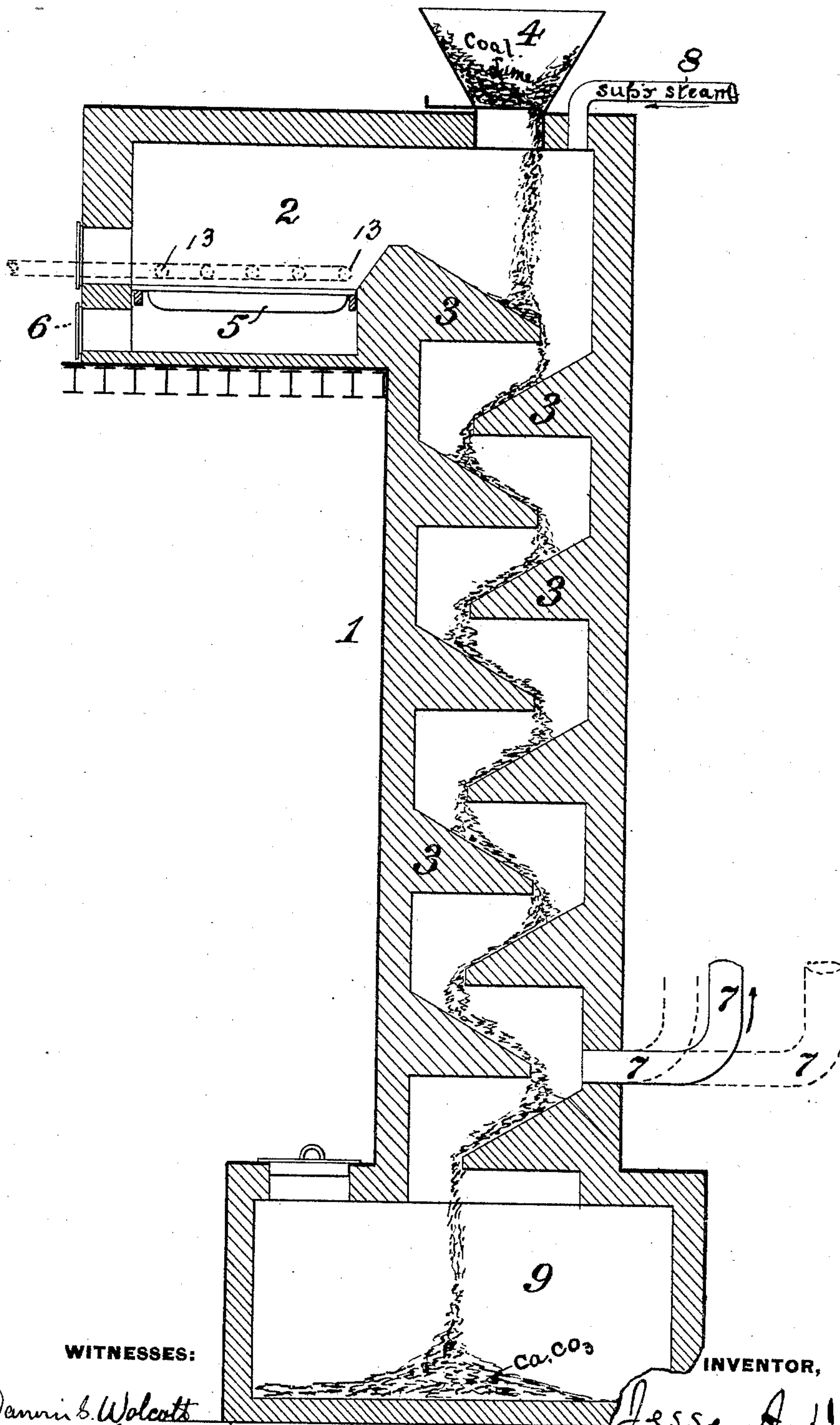
(No Model.)

J. A. DUBBS.

FURNACE FOR THE MANUFACTURE OF GAS.

No. 464,934.

Patented Dec. 8, 1891.



WITNESSES:

Danville B. Wolcott
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INVENTOR,

Jesse A. Dubbs,
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Att'y.

UNITED STATES PATENT OFFICE.

JESSE A. DUBBS, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR OF THREE-FOURTHS TO SAMUEL M. BOYD, OF SAME PLACE.

FURNACE FOR THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 464,934, dated December 8, 1891.

Application filed April 27, 1891. Serial No. 390,628. (No model.)

To all whom it may concern:

Be it known that I, JESSE A. DUBBS, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Furnaces for the Manufacture of Fuel and Illuminating Gas, of which improvement the following is a specification.

The invention described herein relates to certain improvements in the manufacture of fuel and illuminating gas, and has for its object the production of a gas which is rich in combustible elements, as carbonic oxide and hydrogen, but practically free from carbonic acid, which is incombustible. In general terms the invention consists in the method and apparatus hereinafter more fully described and claimed.

In the accompanying drawing, forming a part of this specification, is shown a sectional elevation of a form of apparatus adapted to the practice of my invention.

The apparatus shown consists of a vertical shaft 1 and a furnace or fire-chamber 2, connecting with the upper end of the shaft, which is provided with a series of inclined shelves 3, formed integral with or attached to opposite walls of the shaft. The shelves on one wall alternate with those on the other wall and are made of such a width as to overlap each other, as shown, so that any material charged through the hopper 4 at the top of the shaft 1 will be deposited on the upper shelf and, sliding down the inclined upper surface thereof, will drop onto the next shelf near its junction with the wall of the shaft. The furnace or fire-chamber 2 is provided with grate-bars 5 for the support of solid fuel and the ash-pit thereof with a door 6, provided with a damper for controlling the inflow of air, which is admitted in the practice of my invention in such quantities only as will permit of the proper combustion of the fuel on the grate-bars. As shown in dotted lines, gas-burners 13 may be placed in the fire-chamber, so as to permit of the use of gaseous in lieu of solid fuel. The heat and products of combustion are drawn down the shaft, traversing the shelves 3 by an exhaust apparatus, as a fan (not shown) connected with the shaft at or near its lower end by the pipe or conduit 7.

Carbonaceous material in the form of coal or coke, &c., mingled with a quantity of lime,

is charged into the hopper 4, and, after the shaft has been properly heated, is allowed to drop down onto and along the shelves 3. Simultaneous with the admission of the carbonaceous material and lime superheated steam is also introduced into the upper end of the stack by the pipe 8, connected to any suitable generator. As the carbonaceous material and lime drop down through the shaft they are highly heated by the heat and products of combustion from the furnace or fire, and by the contact of the superheated steam with the highly-heated carbonaceous material and products of combustion from the furnace are separated into their constituent elements, hydrogen and oxygen. The oxygen immediately combines with the carbonaceous material and products of combustion, forming carbonic acid (CO_2) and carbonic oxide (CO), the former an incombustible gas. These gases are formed during the passage of the steam and carbonaceous material through the upper portions of the stack, and as these gases and the lime pass on down through the stack the carbonic acid (CO_2) combines with the lime at the lower end of the stack after said lime has cooled to the proper temperature, forming carbonate of lime, which drops down into the pit 9, formed at the lower end for the shaft, and from which the carbonate of lime may be removed from time to time. The combustible gases—hydrogen and carbonic oxide (CO)—are drawn from the lower end of the stack through the pipe or conduit 7 by the exhaust apparatus and discharged into a receiver or conduits, where by it is conducted to the point or points of use.

I claim herein as my invention—

The combination, with the vertical stack having a series of alternately-arranged overlapping shelves, of the furnace or heating-chamber connected with the upper end of the stack, the hopper and superheated-steam pipe in the upper part of the furnace above the stack, the pit at the bottom of the stack, and the exhaust-pipe leading into the stack above the pit, substantially as described.

In testimony whereof I have hereunto set my hand.

JESSE A. DUBBS.

Witnesses:

R. H. WHITTLESEY,
DARWIN S. WOLCOTT.