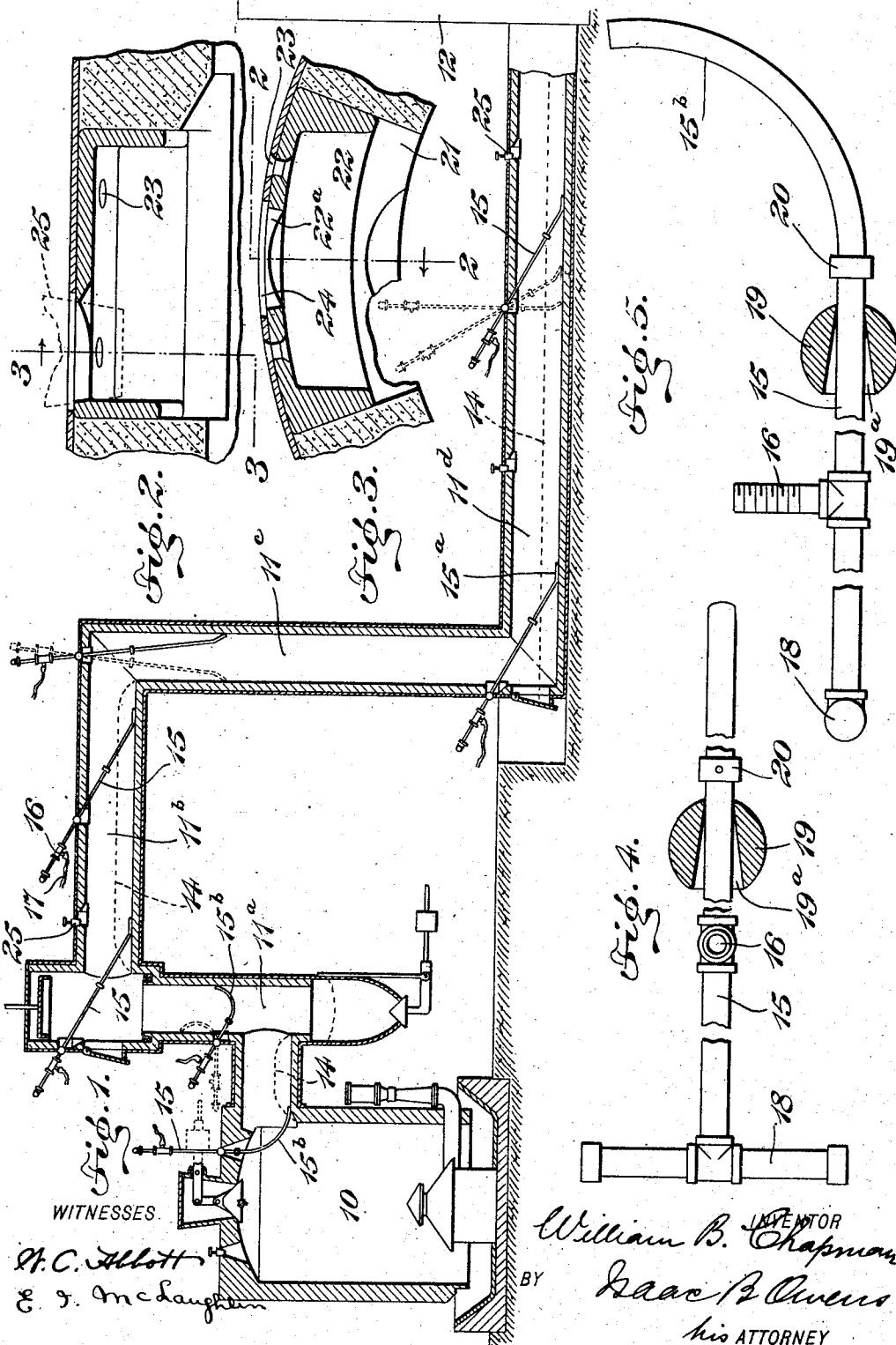


W. B. CHAPMAN,
 MEANS FOR CLEANING GAS FLUES.
 APPLICATION FILED JAN. 14, 1907. RENEWED FEB. 28, 1910.

973,759.

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UNITED STATES PATENT OFFICE.

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MEANS FOR CLEANING GAS-FLUES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM B. CHAPMAN, of the borough of Brooklyn, city and State of New York, have invented certain
5 new and useful Improvements in Means for Cleaning Gas-Flues, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the
10 same.

My invention relates to a means for removing soot, tar and similar carbonaceous accumulations from gas flues, particularly
15 flues connecting gas producers with furnaces or other apparatus for employing the gas. In the practical operation of such plants the soot accumulates rapidly and it has heretofore been the practice to shut down the plant at definite periods for the purpose of burning, scraping and performing other operations
20 in the flue to remove the soot therefrom.

The principal object of my invention is to effect the removal of the soot and like accumulations without interrupting the operation of the plant, the removal of the soot taking place at the same time that the gas is flowing through the tube to the point of consumption. I attain this end by introducing jets of air, steam or other fluid under pressure into the flue and within the
30 body of soot therein thus raising the soot in a cloud, the air current which is thus created picking up the particles of soot and carrying them through the flue and out of the same. By thus creating a fluid current in the flue which moves in the same direction as the gas current and supplements the same, I am enabled to set up a continuous movement
40 of the soot, toward the furnace or other apparatus to which the gas is fed, which current serves to carry the soot into the furnace or other apparatus without interfering in any manner with the continuous operation
45 of the plant. This is of great importance since it prevents the necessity of shutting down a plant for the purpose of cleaning the flues and thus avoids material loss, particularly in large establishments where interruption in the operation of the plant for
50 six or twelve hours involves a general suspension of business and consequent loss.

My invention also involves improved devices for introducing the fluid at different

points along the flue, these devices consisting of peculiarly arranged jet pipes having
55 sealing means and adapted to be introduced into the flue at various points along its length, the air or other fluid current being supplied through a flexible connection so
60 that the jet pipe may be carried from point to point along the flue and the application of the air suited to the conditions within the flue.

For the purpose of a specific disclosure of my invention reference is had to the accompanying drawing which illustrates, as an example, one manner in which my invention may be put into practice and in which drawing:
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Figure 1 is a vertical section of a typical plant involving a gas producer and flue leading from the producer to a furnace or other means for consuming the gas; Fig. 2 is a detail section of one of the casings which are
75 fitted in the flue to receive the jet pipe, the line of section being that indicated at 2—2 of Fig. 3; Fig. 3 is a section on the line 3—3 of Fig. 2; Fig. 4 is a detail view showing one of the jet pipes and the sphere
80 thereon for effecting a joint between the jet pipe and the walls of the flue; and Fig. 5 is a similar view showing a slight modification.

In the drawing, 10 indicates the producer or other source of gas. The flue is shown as
85 being composed of an upright vertical flight 11^a, a horizontal flight 11^b, a down draft vertical flight 11^c and a horizontal flight 11^d running along the level of the ground or floor on which the producer is placed. The
90 gas flue passes to the furnace or other apparatus, the position of which is indicated at 12 in Fig. 1. In the operation of the plant, accumulations of soot, tar and like carbonaceous substances will form along the horizontal
95 flights of the flue as indicated by the broken lines 14 in Fig. 1. The soot will also accumulate in the vertical flights of the flue, but not to that extent which it accumulates in the horizontal flights. The gas passes
100 continuously through the flue and this continuous movement of the gas is necessary to the operation of the plant. In order to remove the sooty accumulations without interrupting the flow of gas I introduce into
105 the body of the soot and air, steam or other fluid current which breaks up the body of the soot, and at the same time sets up the

strong current flowing toward the furnace, in which current the particles of soot are suspended and carried bodily through the flue. This current of air or other fluid flows with the gas current and the force of the two currents together is sufficient to carry along the soot. This, it will be observed, does not interfere with the movement of the gas and thus allows the operation of the plant to be continuous. This current of compressed air, steam or other fluid may be introduced into the flue by various means and my invention is not limited to the devices which are employed for this purpose. I prefer, however, to employ the jet pipes 15 heretofore mentioned. Each of these jet pipes has a connection 16 with a hose or other flexible pipe indicated at 17 in Fig. 1 and each jet pipe is also provided with a handle 18 to facilitate its manipulation. Fitted loosely on each jet pipe 15 is a spherical closure 19 which has a tapered opening 19^a through it, allowing the pipe to be operated in the closure within a certain arc without rocking the closure itself. The sliding movement of the closure on the pipe is confined by the connection 16 on one side and a collar 20 on the opposite side. These jet pipes may be of various forms; I prefer, however, to bend or offset their ends as indicated at 15^a in the drawings, which enables me to enter them readily into the soot beds. Also in certain positions of use, as indicated for example, at 15^b at the right hand extremity of Fig. 1, the jet pipes may be so bent that portions will stand at substantially right angles to each other. In fact the shape of these pipes may be varied within a wide range, to the end that the air or other fluid current may be effectually entered into the bed of soot to break up the same and carry it in suspension through the flue.

In order to introduce the jet pipes into the flue with facility, I form openings 21 in the fire brick lining of the flue in which openings are placed casings 22 held in place by riveting to the sheet metal flue covering, the rivet openings being shown at 23. Formed in said castings 22 are openings 22^a; and the sheet metal covering of the flue is formed with openings 24 matching the openings 22^a. Said openings 22^a and 24 are adapted to receive the plugs 25 when the jet pipes are not in use, and when the plugs 25 are removed the jet pipes may be projected through the openings 22 and the spherical closures 19 set against the walls of the same. It will thus be seen that by removing any one of the plugs 25 a jet tube may be inserted. When thus inserted the closure 19 prevents leakage of gas and the jet pipe may be moved to various positions as indicated by the broken lines in Fig. 1 without disturbing the closure.

In the practical operation of the invention

a number of jet pipes will be provided. This number, however, need not be as great as the number of openings in the flue. Under ordinary conditions the operator should begin to remove the soot by working from the producer end. One of the jet pipes having the bend 15^b may, if desired, be inserted through one of the peek holes of the producer as indicated in Fig. 1 and another may be inserted in the vertical flue 11^a. The air or steam current thus introduced breaks up the soot into dust which is almost, if not quite impalpable and which is readily suspended in the current of air and gas and carried on through the flue. The operator continues working toward the furnace end and the soot is steadily advanced to the furnace. It will seem that this method has the further advantage of saving the heat value of the soot which by my process passes into the furnace and is there consumed. If the movement of the soot through the flue started, as described, at the producer end should cause the soot to clog in the flue toward or near the furnace end, the operation may be advanced to the point at which the flue clogs and this excess blown out, after which the operator may return to the point near the producer and continue the operation in the regular manner described. The process of course, is not limited to the point at which the air or steam current is first applied; this may be at any point along the length of the flue according to the conditions of the plant. The essential idea is the breaking up of a body of soot by an air, steam or other fluid current, which at the same time establishes a fluid current through the flue and which with the gas carries off the particles of soot without interfering with the gas movement through the flue, and thus without interrupting the operation of the plant of which the flue forms a part.

While air may be used in my process with good results, I prefer to use steam for the reason that with steam there will be no burning of the soot or gas in the flue and no danger of explosions and for the further reason that in the class of industrial plants to which my invention particularly relates compressed air is not always at hand while a steam supply is invariably at hand.

Having thus described the preferred embodiment of my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. A gas flue having an opening therein, a removable means for closing the opening, a jet pipe and a closure on the jet pipe, said jet pipe being adapted to enter the opening in the flue upon the removal of the first named closure and the closure on the jet pipe serving to close the opening upon the insertion of the pipe therein.

2. A gas flue having an opening therein, a

casting set in the opening and having an orifice therein, a removable closure adapted normally to seal the orifice in the casting, a jet pipe adapted to be projected through the orifice in the casting when the said closure is removed, and a closure on the jet pipe adapted to seal the orifice when the jet pipe is therein.

3. A gas flue having an opening therein, a movable closure for the opening, a jet pipe adapted to project through the opening upon removal of said closure and a spherical closure on the jet pipe therein serving to seal the opening when the jet pipe is therein.

4. A gas flue having an opening therein, a removable closure for the opening, a jet pipe adapted to be projected in the opening when the closure is removed and a spherical closure on the jet pipe said closure having a tapering opening through which the jet pipe passes loosely.

5. A gas flue having an opening therein, an orificed casing placed in the opening, a removable closure for the orifice, a jet pipe adapted to project through the orifice when the closure is removed and the spherical closure on the jet pipe for the purpose specified.

6. A device for cleaning gas flues comprising a jet pipe with a spherical closure loosely mounted thereon.

7. A device for cleaning gas flues comprising a jet pipe and a spherical closure

having a tapering opening through which the jet pipe passes loosely.

8. A gas flue having an opening therein, a jet pipe adapted to project through the opening and a spherical closure on the jet pipe serving to seal the opening when the jet pipe is therein.

9. A gas flue having an opening therein, a jet pipe adapted to be projected in the opening and a spherical closure on the jet pipe said closure having a tapering opening through which the jet pipe passes loosely.

10. A gas flue having an opening therein, an orificed casing placed in the opening, a removable closure for the orifice, a jet pipe adapted to project through the orifice when the closure is removed and the spherical closure on the jet for the purpose specified, said spherical closure having a tapering opening therein in which the jet pipe is received.

11. A device for cleaning gas flues comprising a jet pipe adapted to be projected through an opening in the flue and a closure for said opening mounted on the pipe.

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

WILLIAM B. CHAPMAN.

Witnesses:

ISAAC B. OWENS,

E. I. McLAUGHLIN.