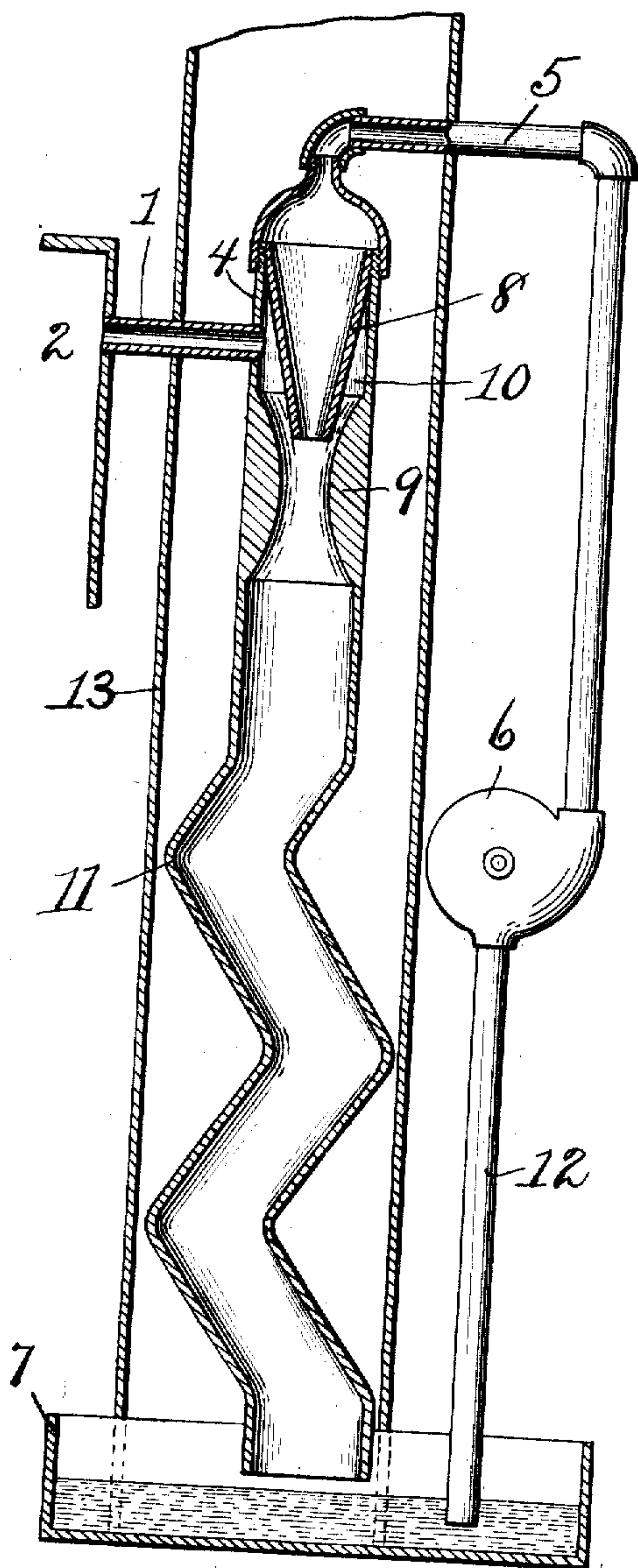


S. I. CLAWSON.  
 APPARATUS FOR CONDENSING AND PURIFYING SMOKE, &c.  
 APPLICATION FILED MAR. 9, 1908.

922,260.

Patented May 18, 1909.



Witnesses  
*Albert Popkins*  
*Mary W. Hammer*

Inventor  
*Selden I. Clawson*  
 By *Sturtevant & Mason*  
 Attorneys



# UNITED STATES PATENT OFFICE.

SELDEN IRWIN CLAWSON, OF SALT LAKE CITY, UTAH.

APPARATUS FOR CONDENSING AND PURIFYING SMOKE, &c.

No. 922,260.

Specification of Letters Patent.

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*To all whom it may concern:*

Be it known that I, SELDEN IRWIN CLAWSON, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake, State of Utah, have invented certain new and useful Improvements in Apparatus for Condensing and Purifying Smoke, &c., of which the following is a description, reference being had to the accompanying drawing, and to the figures of reference marked thereon.

My invention relates to processes and apparatus for condensing and purifying fumes, smoke or gases, evolved or produced by metallurgical or other furnaces for the purpose of arresting fumes and the particles of solid matter carried in suspension by such fumes, smoke or gases.

While the invention is particularly intended to be used in connection with metallurgical furnaces for the purpose of arresting the particles of metal and metallic material in the form of oxids, chlorids, sulfate or other metallic compounds, which would otherwise be carried off by the smoke or fumes, and be lost, and subsequently recovering from the material so arrested, the metal contained therein, the invention is applicable to the treatment of smoke to free it from the particles of carbon or other solid matter carried by it.

In the ordinary operation of roasting or smelting furnaces, it is customary to so operate the apparatus as to avoid, so far as possible, the production of smoke or fumes carrying particles of the metallic material treated so as to avoid loss. It is the purpose of my invention to so effectively condense and arrest the solid materials, however heavily loaded the smoke or fumes may be, thus rendering it possible to so run the smelting or roasting furnace as to volatilize as fully as possible the metal of the ore or other material treated.

With this object in view, my invention consists in the process of, and apparatus for, condensing and arresting the fumes, and solid particles carried by smoke, fumes or gases hereinafter described, and particularly pointed out in the claims.

Referring to the drawings, the figure is a vertical sectional view, showing the apparatus of my invention.

In the drawings, 1 is a flue or smoke pipe leading from a metallurgical or other fur-

nace 2. 4 is a vertical pipe, to which the end of the flue or smoke pipe 1 is connected. The upper end of the vertical pipe 4 is connected by a pipe 5, with the discharge port of a pump 6, which is here shown as a rotary pump, but may be of any usual or convenient form. The lower end of the vertical pipe 4 terminates a short distance above the surface of the water in a tank 7. The vertical pipe 4 is provided with a cone 8, extending from a point above the end of the flue or smoke pipe 1, and terminating below the said end thereof. Below the lower end of the cone 8, the internal diameter of the vertical pipe is constricted for a short distance by means of an internal collar or ring 9, preferably having the opening there-through tapered from both ends toward the middle. The cone 8 and the internal ring or collar 9, are so arranged as to leave an annular space 10 about the cone, into which annular space the flue or smoke pipe 1 opens. Below the internal collar or ring 9, the vertical pipe 4 is preferably bent, as shown at 11, to form a zigzag passage.

From the tank 7, a pipe 12 leads to the inlet port of the pump 6. A chimney or flue 13, preferably surrounds the vertical pipe 4, its walls serving to support the pipes 1 and 5, and to thus support the vertical pipe 4, to which these pipes are connected.

In the operation of the apparatus, as above described, the pump being set in operation, draws water from the tank 7 through the pipe 12, and forces it through the pipe 5 and discharges it through the cone 8 into the vertical pipe 4. As the water is discharged through the cone, it tends to form a vacuum in the annular space 10, thus drawing in the smoke or fumes from the furnace through the pipe 1. The stream of water carries the smoke or fumes with it through the internal collar or ring 9, and as the mingled water and smoke pass downward, the fumes and solid matter become thoroughly disseminated and mixed, so that the water is brought in contact with every particle of solid matter, cooling and condensing these particles, and carrying them with it to the tank 7, the gases freed from solid matter escaping upward through the flue or chimney 13.

The water may be circulated until it becomes loaded with the particles of solid matter, when it may be allowed to rest to



permit the particles of solid matter suspended in it to settle, when the clear water may be drawn off, and the sediment may be treated for the recovery of the metal contained in it.

The water used may become charged with sulfurous acid or other acids or gases, or with soluble salts which may also be recovered and utilized.

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

1. In an apparatus for collecting material carried in suspension by fumes coming from metallurgical furnaces, the combination with a flue leading from the furnace, of a pipe with which said flue communicates, a tank containing liquid above the surface of which said pipe terminates, a constricted portion in said pipe below its connection with said flue, a cone in said pipe opposite the said connection and having its small end terminating adjacent to said constricted portion, a second pipe leading from below the surface of the liquid in said tank to the large end of said cone, and means in said second

pipe to force liquid from said tank into the large end of said cone.

2. In an apparatus for collecting material carried in suspension by fumes coming from metallurgical furnaces, the combination with a flue leading from the furnace, of a pipe with which said flue communicates, a tank containing liquid above the surface of which said pipe terminates, a constricted portion in said pipe below its connection with said flue, a cone in said pipe opposite the said connection and having its small end terminating adjacent to said constricted portion, a second pipe leading from below the surface of the liquid in said tank to the large end of said cone, means in said second pipe to force liquid from said tank into the large end of said cone, and a chimney surrounding said pipe and supporting said flue and tube.

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

SELDEN IRWIN CLAWSON.

Witnesses:

LAURA P. COREY,  
SPENCER CLAWSON.