

UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF NEW YORK, N. Y.

APPARATUS FOR TRAPPING SOLID PARTICLES IN SUSPENSION IN GAS-CURRENTS.

1,090,490.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Apparatus for Trapping Solid Particles in Suspension in Gas-Currents, of which the following is a specification.

The invention relates to apparatus for trapping solid particles in suspension in gas currents. The construction is such that the particles after traversing a duct strike a plate disposed in front of the duct outlet, and at the moment of impact and consequent loss of energy, are washed from said plate into a suitable receptacle below. The duct is preferably vertical, and traversed by water streams which inclose the gas current, so that the particles after striking the plate are prevented from rebounding or being carried therefrom by the gas current by the encompassing screen of water formed by said streams.

In the accompanying drawings—Figure 1 is a vertical section of my device, shown connected to the delivery flue of a steam boiler. Fig. 2 is a section on the line x, x of Fig. 1. Fig. 3 is a top view of the top wall of casing 1.

Similar numbers of reference indicate like parts.

1 is a vertical casing having its lower portion downwardly tapering to form a water tank 2, at the bottom of which is an outlet pipe 3, in which is a valve 4. An inlet duct 5 leads from the boiler 6, and conveys the gas current in which the solid particles are entrained into the duct 7 within casing 1 and depending from the top wall 8 of said casing. Within duct 7 is a tube 9, through which passes the suspension cord 10 of a plate 11 which is disposed below the outlet opening of duct 7. Said plate preferably has a conical projection 12 which extends upwardly into duct 7. Cord 10 passes over suitable guide-pulleys, and may be operated by the drum 13 to raise or lower plate 11, so as to vary the distance of said plate from the outlet of duct 7. The top wall 8 is disposed somewhat below the upper edge of casing 1, so as to form a receptacle 14 for water received from a pipe 15 leading from any suitable source of supply. In said top wall and communicating with duct 7 is a circular row of openings 16. Similar open-

ings 17 are made in said wall, communicating with tube 9. On the exterior of duct 7 and immediately below inlet duct 5 is a pan 18, communicating with duct 7 by perforations 19 in the wall of said duct. Water is delivered into said pan from receptacle 14 by a pipe 20, and thence passes by perforations 19 into duct 7. An outlet duct 21 leading to the stack or chimney communicates with the upper portion of casing 1. In operation, water from receptacle 14 passes through the perforations 16 in top wall 8 into duct 7, and descends preferably along the inner periphery thereof. The portion of said periphery which otherwise would be shielded by the inlet duct 5, receives streams from the perforations 19 communicating with pan 18.

The gas current entraining the solid particles to be trapped enters duct 7 through duct 5, and descends in the space within said duct which is surrounded by the water streams. On escaping from the outlet, said particles strike the surface of the plate 11, thus losing energy. At the same time the descending water streams also strike the plate, and operate to engage the particles thereon and to wash the same over the edge of the plate through the clearance 22 between said edge and casing 1, and so into the tank. The descending streams form practically a tubular shell of water surrounding the descending particles. Said tubular shell, while it permits passage of the gas current between the surface of plate 11 and the lower outlet end of duct 7, removes from said current practically all the particles which have not been engaged by the water on plate 11 and washed from said plate, as already described.

In order still further to insure the trapping efficiency of the apparatus, the plate 11 is provided with the conical projection 12, which extends upwardly into duct 7. The water streams which enter tube 9 through perforations 17 encounter this projection and flow down the same to plate 11. The particles on the plate are thus acted upon by the stream from tube 9 as well as by the stream descending the walls of duct 7.

I claim:

1. An apparatus for trapping solid particles in suspension in a gas current, comprising a duct for said current, a plate disposed in front of the outlet of said duct and receiving the impact of said particles, means

for delivering water upon the impact surface of said plate, and means for varying the distance between said plate and said duct.

2. An apparatus for trapping solid particles in suspension in a gas current, comprising a vertical duct for said current, a series of circularly disposed water inlets above said duct and delivering into the same substantially a tubular shell of water inclosing said current, and a plate below the outlet of said duct and at a distance therefrom and receiving the impact of said water and said particles escaping from said duct.

3. An apparatus for trapping solid particles in suspension in a gas current, comprising a vertical duct for said current, means for delivering into said duct a plurality of water streams inclosing said current, a plate below said duct, and a conical projection on said plate entering said duct; the said plate and projection receiving the impact of said water and said particles.

4. An apparatus for trapping solid particles in suspension in a gas current, comprising a casing having an outlet for said current, a vertical duct in said casing, a gas inlet duct communicating with said vertical duct, means for delivering water into said vertical duct, a plate disposed below the outlet of said duct and at a distance therefrom and receiving the impact of said water and

said particles, and means for raising and lowering said plate; there being a clearance between said casing and said plate.

5. An apparatus for trapping solid particles in suspension in a gas current, comprising a vertical duct for said current, a plate disposed below the outlet of said duct, a conical projection on said plate entering said duct, two concentric series of circularly disposed water inlets above said duct; one of said series delivering substantially a tubular shell of water into said duct and upon said projection, and the other of said series delivering substantially a tubular shell of water into said duct and upon the face of said plate outside of said projection.

6. An apparatus for trapping solid particles in suspension in a gas current, comprising a vertical duct for said current, a plate disposed below the outlet of said duct, a conical projection on said plate entering said duct, and a series of circularly disposed water inlets above said duct delivering substantially a tubular shell of water into said duct and upon said projection.

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS E. MURRAY.

Witnesses:

GERTRUDE T. PORTER,
MAX T. MCGARRY.