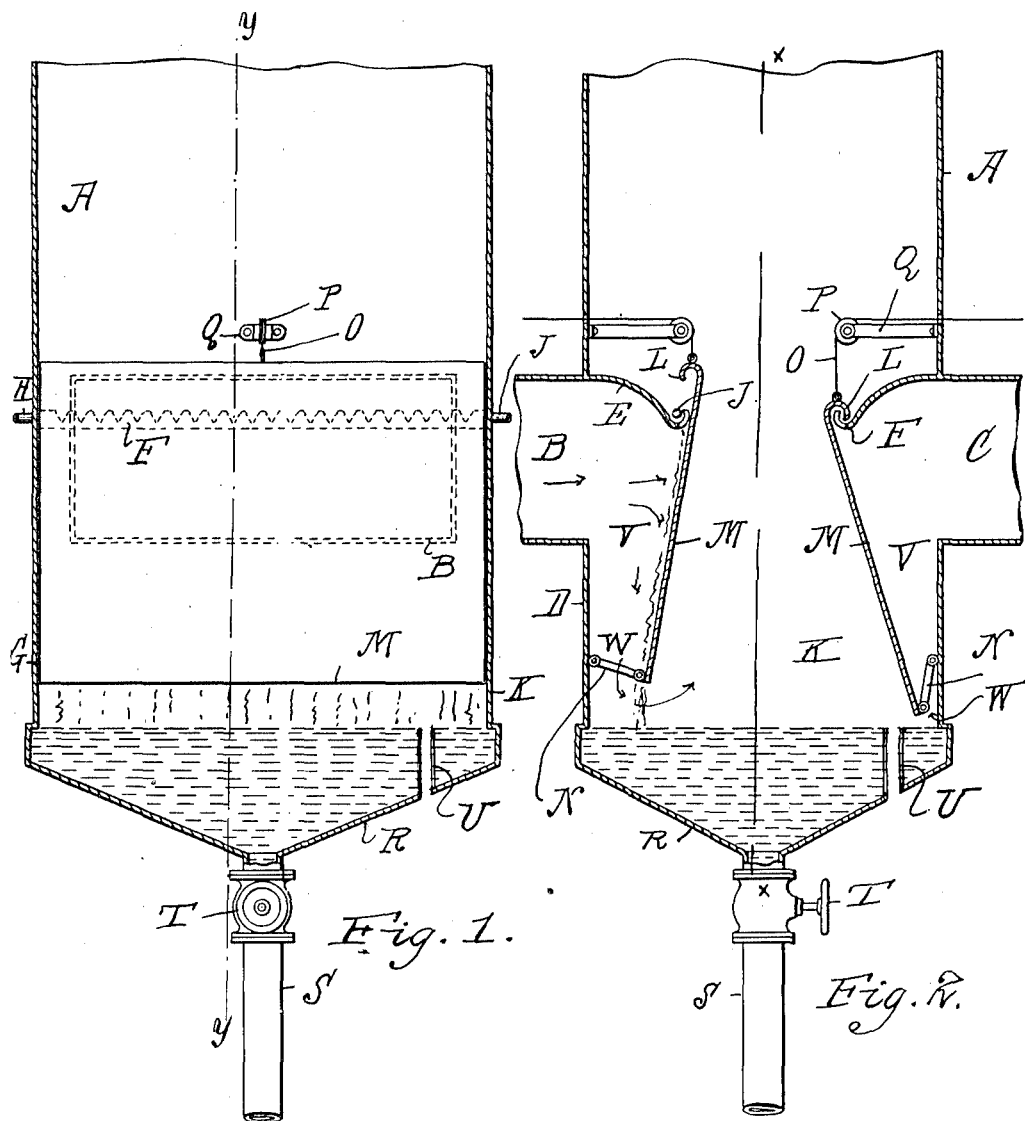


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 DEVICE FOR TRAPPING PARTICLES IN SUSPENSION IN GAS CURRENTS.  
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# UNITED STATES PATENT OFFICE.

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DEVICE FOR TRAPPING PARTICLES IN SUSPENSION IN GAS-CURRENTS.

1,073,621.

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 Devices for Trapping Particles in Suspension in Gas-Currents, of which the following is a specification.

10 The object of the invention is to entrap the maximum percentage of solid particles entrained with and suspended in a gas current.

15 The invention consists in the construction, hereinafter set forth, whereby the cross-sectional area of the outlet of a vertical flue, through which said particles are projected upon a body of water, may be varied, and whereby the distance of said outlet from 20 said water may be simultaneously altered.

In the accompanying drawings—Figure 1 is a vertical section on the line  $x, x$  of Fig. 2 of my apparatus for trapping solid particles in suspension in gas currents. Fig. 2 25 is a vertical section of Fig. 1.

Similar letters of reference indicate like parts.

30 A represents a vertical stack or flue, which receives gas currents from the horizontal flues B and C. Said flues B and C may lead from boiler-furnaces, in which case the gas currents therein will entrain cinders or other solid particles which it is the object of the present device to remove before said currents pass to the stack A, and so to the atmosphere. As the arrangement of the device is the same with respect to each of the flues B and C, a description of the parts associated with one flue applies equally to 40 both.

45 Extending inwardly from a wall, as D, of the stack, and above the flue B, is a partition E. Said partition is bent downwardly, and then upwardly, to form a gutter F, the outer edge of said gutter being indented, as shown in dotted lines Fig. 1. Entering the stack wall G, above partition E, is a pipe H which supplies water to the gutter F. Another water supply pipe J may, 50 if desired, lead to the opposite end of said gutter through the stack wall K. The gutter F receives the bent over upper edge L of a loose partition M, as shown on the right of Fig. 2, and when the partition is in this position, it is suspended from partition E. 55 The edges of said partition are in proximity

to opposite walls G, K of the stack, as shown in Fig. 1, so that said partition with the walls of said stack together form a vertical compartment or duct. The lower 60 edge of partition M is connected to the adjacent stack wall by a link N. There may be several such links connected to said partition and wall. To partition M is attached a wire cord or rope O, which passes over a 65 pulley P, supported on a bracket Q within the stack, and is led out of the stack through a suitable opening in the wall thereof. By means of the cord O, the partition M may be raised bodily from the position shown on 70 the right to that shown on the left of Fig. 1, and when so raised, said partition is suspended by said cord, its edge L then being lifted out of the gutter F. The link N is then caused to assume a more nearly horizontal 75 position. By reason of this raising of the partition M, the area of the interval between its lower edge and the adjacent side wall of the stack is enlarged. The minimum area of this interval is attained when the 80 edge L of partition M rests in the gutter F, and the maximum area when the partition is raised to bring the link N into an approximately horizontal position. At the bottom 85 of the stack is provided a funnel-shaped tank R for water, which, at its constricted end, communicates with a discharge pipe S, having a valve T. Any suitable means for maintaining the water level constant may be installed, such as the open vertical overflow- 90 pipe U.

The operation is as follows: Water admitted to gutter F by pipe H or pipes H and J escapes through the indentations in the edge of said gutter, flows downwardly on 95 the surface of partition M, and so enters the tank R. After the water in said tank rises to a predetermined level, the excess escapes continuously by pipe U, the level thus being maintained constant. The gas 100 current entering by flue B, first impinges upon this descending water sheet, then passes downwardly in the duct V formed between the stack wall D and partition M, and escapes at the constricted opening W between said partition and wall. Practically 105 all of the solid particles in said gas current which have not been caught by the descending water sheet are projected downwardly upon the surface of the water in tank R 110 and there trapped. Any which may escape are obliged to encounter the water falling

from the lower edge of partition M before they can enter the stack A, and are caught in this way. The object of raising and lowering the partition M is to adapt the apparatus for use in connection with gas currents of varying velocity, such as frequently occur, for example, in steam-boilers using forced draft, which under special conditions or to meet load emergencies, may be driven temporarily much above their normal ratings. The opening W between partition M and stack wall may at the outset be fixed at such an area as, with a current in the flue of some predetermined normal velocity, will cause the particles to be projected over a certain minimum distance to the water below, the velocity of escape and the distance traversed being such as will result in effective trapping of the particles. This, for example, may be represented by the position of the parts shown on the right of Fig. 1. If now, the current velocity should increase in the flue, the partition M is raised, thus enlarging the area of opening W, and increasing the distance of that opening from the water level, until the velocity of escape of the particles at said opening is reduced to that which they had prior to said increase; or, in other words, by varying the area of the outlet W and the distance of said outlet from the water level, the striking force of the particles upon the water below is kept substantially constant. Where the current velocity in the flue is to be normally high, and decreases therein are to be guarded against, the position of the parts shown on the left of Fig. 2 may be the normal position, and a fall in velocity is then met by lowering the partition M, say to the position shown on the right of Fig. 2, in order to increase the velocity of current discharge and reduce the interval over which the particles are projected.

The object of the indentations in the edge of gutter F is to distribute the flow from said gutter over the surface of partition M, and to prevent said flow being cut off by contact of partition and gutter, as might occur if the gutter edge were straight.

The accumulation of solid matter in the tank R is removed from time to time by opening valve T, the flue currents being temporarily shut off.

I claim:

1. A device for trapping particles in suspension in a gas current, comprising a flue, a tank therein, a vertical duct in said flue communicating at its upper portion with a source of gas current, terminating above said tank and having a suspended wall, a link connecting said suspended wall to the opposite fixed wall of said duct, and means for bodily raising and lowering said suspended wall.

2. A device for trapping particles in sus-

pension in a gas current, comprising a flue, a partition therein forming with the flue walls a vertical duct having an inlet for gas current at its upper end and an outlet at its lower end, means for raising and lowering said partition and to vary the cross sectional area of the outlet of said duct, and a tank disposed in said flue below said partition.

3. A device for trapping particles in suspension in a gas current, comprising a flue, a tank therein, a partition extending inwardly from a wall of said flue, said flue having a gas current inlet below said partition, a loose partition in said flue forming with the flue walls a vertical duct and terminating above said tank, means for suspending said loose partition in proximity to the inner edge of said first-named partition, and means for bodily raising and lowering said loose partition and to vary the cross sectional area of the outlet of said duct.

4. A device for trapping particles in suspension in a gas current, comprising a flue, a tank therein, a partition extending inwardly from a wall of said flue, said flue having a gas current inlet below said partition, a loose partition in said flue forming with the flue walls a vertical duct and terminating above said tank, means for suspending said loose partition in proximity to the inner edge of said first named partition, and means for bodily raising and lowering said loose partition, and a link between said loose partition and said flue wall.

5. A device for trapping particles in suspension in a gas current, comprising a flue, a tank therein, a partition extending inwardly from a wall of said flue, said flue having a gas current inlet below said partition, a loose partition in said flue forming with the flue walls a vertical duct and disposed above said tank, means for suspending said loose partition from said first-named partition, and means for bodily raising said loose partition and to vary the cross sectional area of the outlet of said duct.

6. A device for trapping particles in suspension in a gas current, comprising a flue, a tank therein, a partition extending inwardly from a wall of said flue, said flue having a gas current inlet below said partition and a water inlet above said partition, a loose partition in said flue forming with the flue walls a vertical duct and terminating above said tank, and means for suspending said loose partition in proximity to the inner edge of said first-named partition, and means for bodily raising and lowering said loose partition and to vary the cross sectional area of the outlet of said duct.

7. A device for trapping particles in suspension in a gas current, comprising a ver-

tical flue, a tank therein, a partition extending inwardly from a wall of said flue and having a gutter at its inner edge, said flue having a gas current inlet below said partition, a loose partition in said flue forming with the flue walls a vertical duct and having its upper edge bent over and received in said gutter and terminating at its lower edge above said tank, a link connecting said loose partition to said flue wall, and means for bodily raising and lowering said loose partition.

8. A device for trapping particles in suspension in a gas current, comprising a vertical flue, a tank therein, a partition extending inwardly from a wall of said flue and having a gutter at its inner edge, said flue

having a gas current inlet below said partition and a water inlet communicating with said gutter, a loose partition in said flue forming with the flue walls a vertical duct and having its upper edge bent over and received in said gutter and terminating at its lower edge above said tank, a link connecting said loose partition to said flue wall, and means for bodily raising and lowering said loose partition.

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

THOMAS E. MURRAY.

Witnesses:

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