T. E. MURRAY.

APPARATUS FOR TRAPPING SOLID PARTICLES IN SUSPENSION IN GAS CURRENTS.

APPLICATION FILED JUNE 9, 1913.

1,087,970. Patented Feb. 24, 1914.

2 SHEETS—SHEET 1.

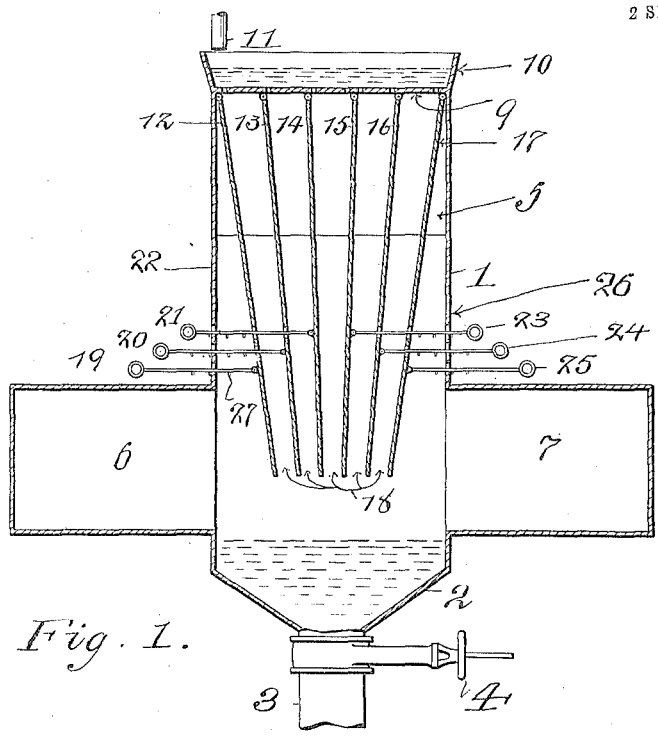

Fig. 1.

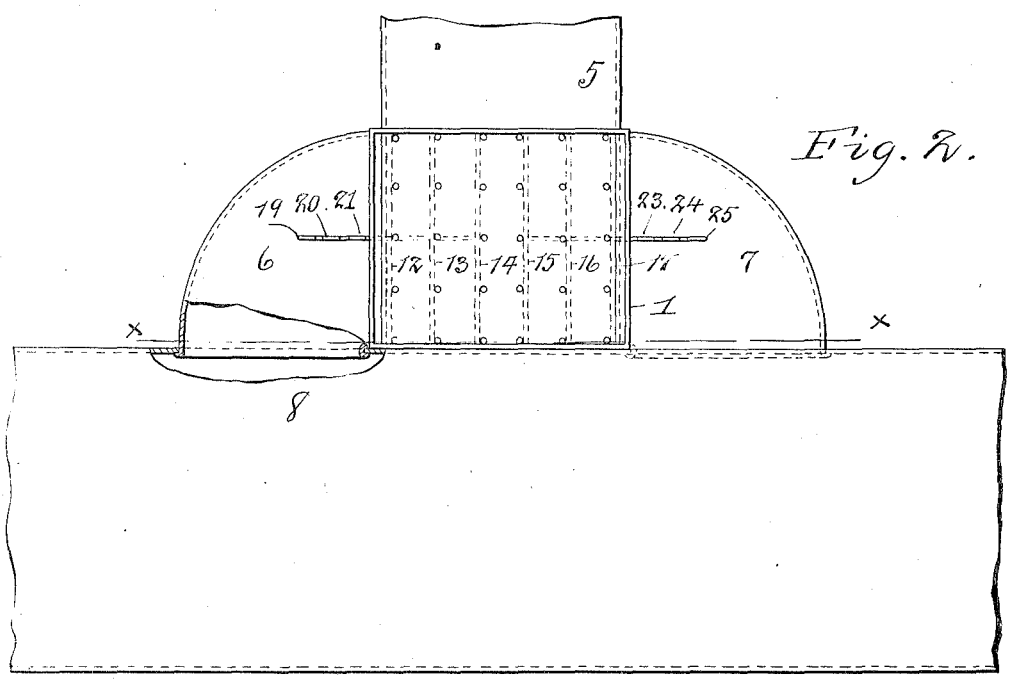

Fig. 2.

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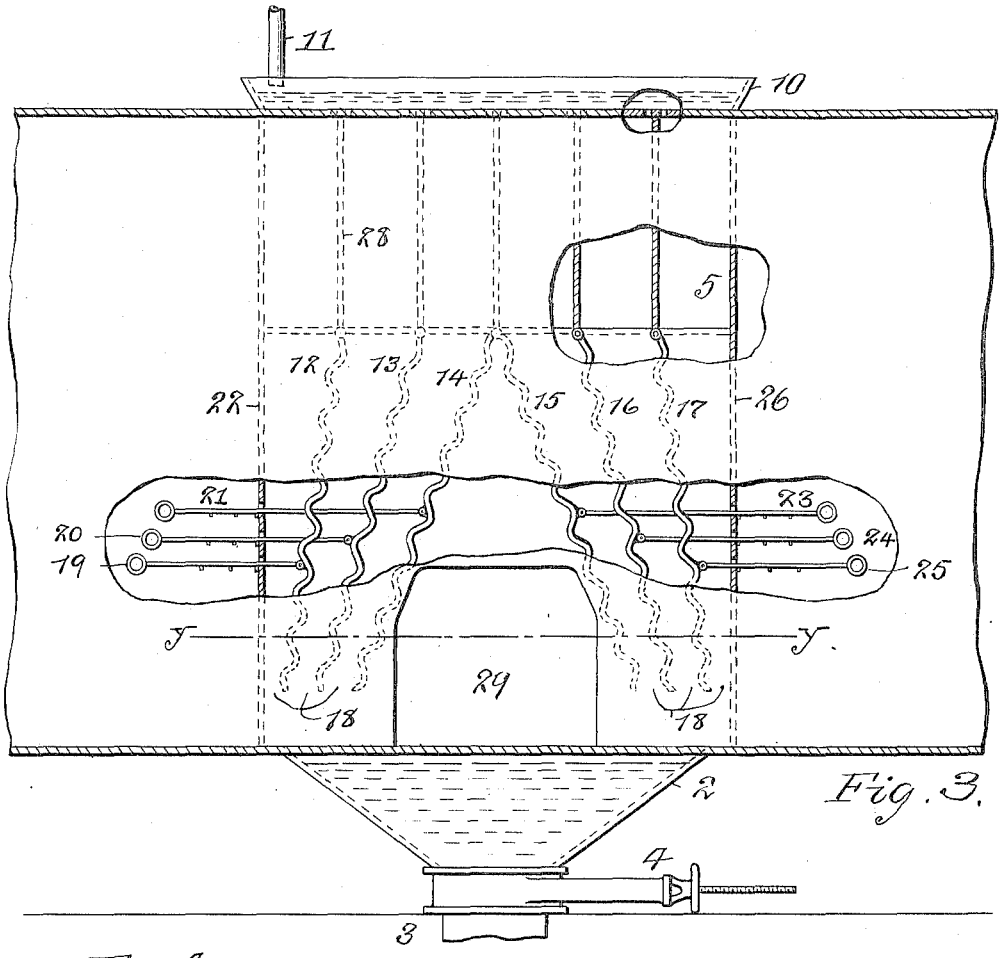

Fig. 3.

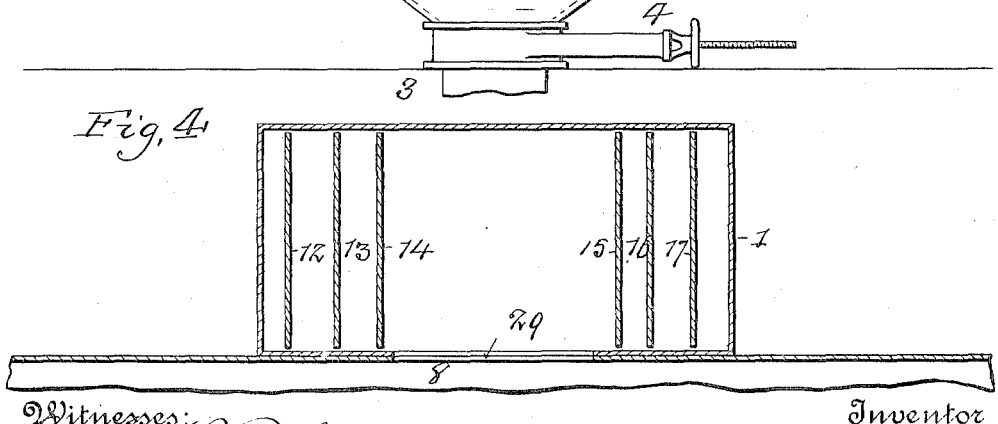

Fig. 4.

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UNITED STATES PATENT OFFICE.

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

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

1,087,970. Specification of Letters Patent. Patented Feb. 24, 1914.

Application filed June 9, 1913. Serial No. 772,526.

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 is a device for trapping particles in suspension in a gas current, of the type set forth in U. S. Letters Patent No. 1,064,984, granted June 17, 1913, to Charles B. Grady and myself, and consists in the construction and arrangement of the swinging partitions for varying the cross sectional area of the outlet of the duct through which said particles are projected upon a body of water, and also of the means for supplying descending streams of water to said current.

This apparatus is another embodiment of the principle set forth in the Letters Patent aforesaid and has for its object to entrap the maximum percentage of solid particles entrained with and suspended in the gas current. When boilers furnish the power for electric lighting installations, the demands upon them vary at different periods of the day and sometime suddenly increase. The gas currents in the flues then vary greatly in velocity, with corresponding variations in the quantity of solid matter entrained.

In the apparatus of the aforesaid patent as well as in the present device there is provided a body of liquid, preferably water, which receives and retains the particles projected upon it. The stream of particles is projected vertically downward upon the surface of the liquid.

When the gas current varies in velocity, the swinging partitions are here moved to vary the cross sectional area of the delivery outlet proportionately to said velocity, so that as this velocity decreases, the area will decrease, and as the velocity increases, the area will increase, thus maintaining a constant—or substantially constant—velocity of the projected jet of particles, and thus neutralizing the effect of the velocity changes in the current in the flue. If, therefore, at the outset, and for some selected velocity of flue current, the interval between the delivery outlet and the liquid level be chosen which will be, on the one hand, sufficiently large not to impose a constriction in the path of the escaping gases, and, on the other, not too great materially to diminish the inertia of the projected particles before they strike the liquid, then it is obvious that no matter what conditions arise in the boilers capable of changing that velocity, by keeping the velocity of the projected jet constant, the advantageous status previously decided upon can be maintained, or, in other words, the effects of the varying conditions can be eliminated.

In the accompanying drawings—Figure 1 is a vertical section on the line x, x of Fig. 2. Fig. 2 is a top view. Fig. 3 is an elevation of a modified form of the apparatus. Fig. 4 is a section on the line y, y of Fig. 3. In Figs. 2 and 3 portions are broken away to show internal construction.

Similar numbers of reference indicate like parts.

1 is a vertical casing rectangular in cross section and 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 leading from the source of gas current in which the solid particles to be trapped are entrained communicates with the upper part of casing 1. Two outlet ducts 6, 7 are arranged on opposite sides of the lower part of the casing and lead into the main flue 8, which in turn may communicate with stack or chimney or other final discharge conduit. The horizontal top wall 9 of casing 1 has side flanges 10 to form a receptacle for water admitted by a pipe 11 leading from any suitable source of supply. Hinged at their upper edges to said top wall 9 are a plurality of swinging partitions 12, 13, 14, 15, 16, 17, which are of sufficient width to extend across the casing and so to divide the space therein into five downwardly tapering ducts.

The partitions 12, 13, 14 are provided with operating bars 19, 20, 21. Bar 21 connected to partition 14 passes through slots in partitions 12, 13 and a slot in the wall 22 of the casing. Bar 20 connected to partition 13 passes through a slot in partition 12 and a slot in said wall. Bar 19 connected to partition 12 passes through a slot in said wall. Bars 23, 24, 25, similarly arranged, are connected to partitions 15, 16, 17 and extend through the opposite wall 26. By operating any one of these bars, the partition to which

it is connected may be adjusted at any desired inclination, and there held by a pin, as 27, on the operating bar engaging with the casing wall. In this way, the cross sectional area of the space between the lower edges of any two adjacent partitions and the casing walls which their vertical edges approximate, may be varied, and hence the whole cross sectional area comprised between the lower edges of the two outer partitions 12 and 17 and said casing walls may be adjusted.

In the top wall 9 are made a number of holes disposed so that the water entering the receptacle formed by said wall and flanges 10 may first run down the inclined sides of the swinging partitions, and then fall into the tank 2.

In operation, the gas current entering by duct 5 passes downwardly through the tapering ducts 18 formed between the partitions 12 to 17, and thence is directly projected upon the surface of the water in tank 2. In ducts 18 a portion of the solid particles in said current are engaged by the streams of water descending the surfaces of said partitions. Another portion and practically all the remaining particles remain in the water in tank 2. The purified gas current escapes by outlet ducts 6, 7, to flue 8.

In the modified form of the device shown in Figs. 3 and 4, a number of short fixed vertical partitions 28 are disposed in the upper part of the casing 1 directly in front of the opening of inlet duct 5. The swinging partitions 12 to 17 are here hinged to the lower edges of partitions 28, and are also corrugated transversely. Instead of two outlet ducts 6, 7, communicating with opposite walls of the casing 1, I here provide but a single opening 29 through one wall of the casing and the wall of flue 8, through which the purified gases pass directly to said flue. The partitions are arranged in groups, of three each on each side of said opening, and the tapering ducts 18 are accordingly formed between the outermost partitions 12, 17 and the walls 22, 26 of the casing, as well as between the partitions of each group. By manipulating the operating bars, as already described, the cross sectional area of the outlet spaces between the partitions in each group may be regulated. The object of regulating the outlet spaces aforesaid and the principle involved is fully set out in Patent No. 1,064,984, aforesaid.

The object of corrugating the partitions is to enlarge the area over which the descending water streams flow, and thus to cause an increased engagement of the particles by said streams.

I claim:

1. An apparatus for trapping particles in suspension in a gas current, comprising a duct conveying said current, a plurality of partitions suspended therein and dividing said duct into a plurality of channels, means for independently varying the inclination of said partitions to increase or diminish the outlet area for the current at their lower ends, and a tank in said duct below said partitions.

2. An apparatus for trapping particles in suspension in a gas current, comprising a duct conveying said current, a plurality of partitions suspended therein and dividing said duct into a plurality of channels, means for independently varying the inclination of said partitions to increase or diminish the outlet area for the current at their lower ends, and means for delivering liquid streams upon the upper sides of said partitions.

3. An apparatus for trapping particles in suspension in a gas current, comprising a duct conveying said current, a plurality of transversely corrugated partitions suspended therein and dividing said duct into a plurality of channels an independent conduit communicating with the source of current and delivering the same into said duct, and means for delivering liquid streams upon said partitions.

4. An apparatus for trapping particles in suspension in a gas current, comprising a duct conveying said current, a plurality of transversely corrugated partitions suspended therein and dividing said duct into a plurality of channels, means for delivering liquid streams upon said partitions, means for independently varying the inclination of said partitions to increase or diminish the outlet area for the current at their lower ends, and a tank in said duct below said partitions.

5. An apparatus for trapping particles in suspension in a gas current, comprising a duct conveying said current, a plurality of transversely corrugated partitions suspended therein and dividing said duct into a plurality of channels, an inlet duct for liquid disposed above said channels, and an independent conduit communicating with the source of current and delivering the same into said duct through a wall thereof.

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

THOMAS E. MURRAY.

Witnesses:
GERTRUDE T. PORTER,
MAY T. MCGARRY.