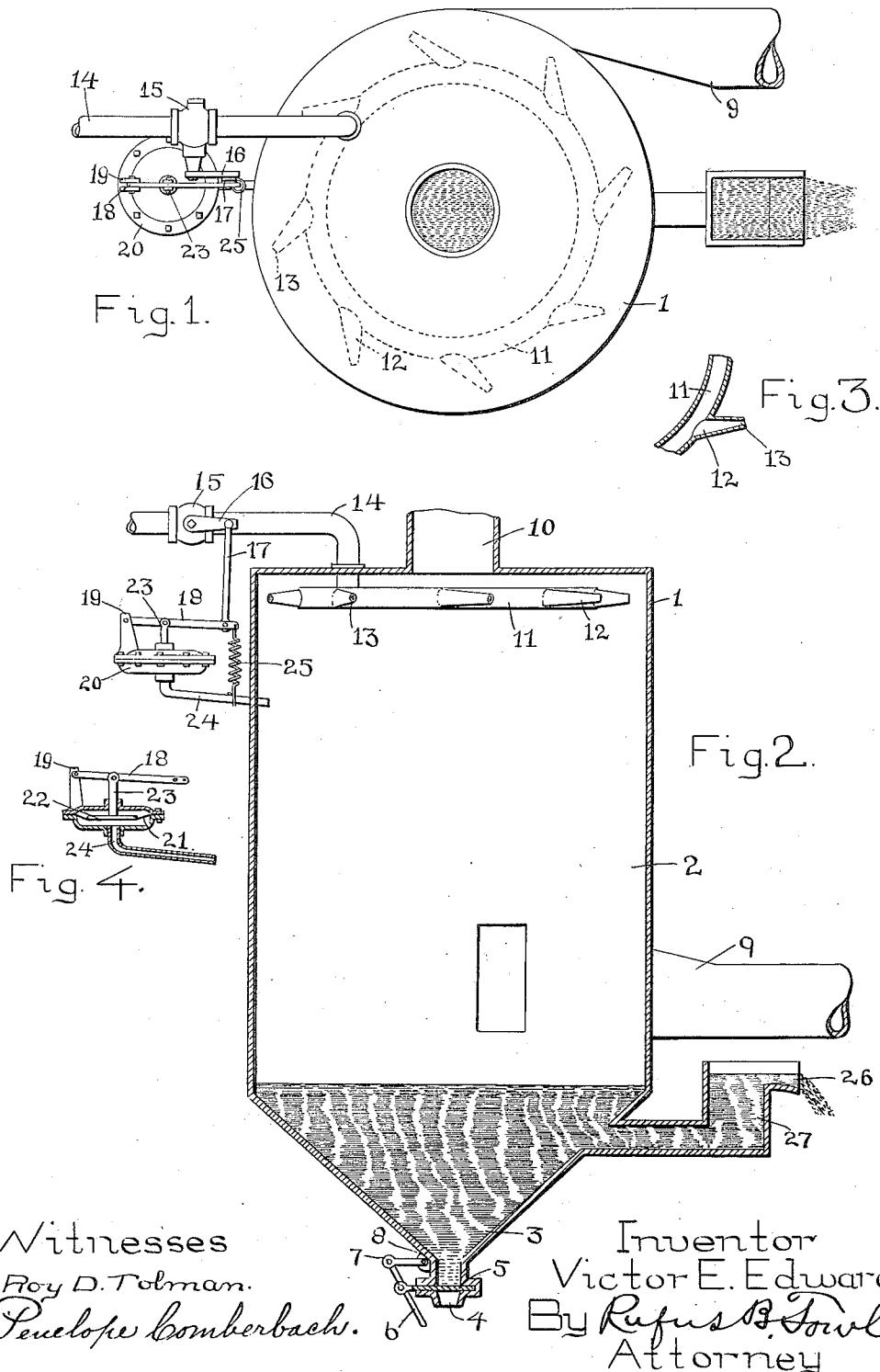


V. E. EDWARDS.
DUST CATCHER.
APPLICATION FILED APR. 8, 1904.

968,456.

Patented Aug. 23, 1910.



Witnesses

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UNITED STATES PATENT OFFICE.

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DUST-CATCHER.

968,456.

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To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in a Dust-Catcher, of which the following is a specification accompanied by drawings forming a part of the same, in which—

Figure 1 is a plan view of a dust catcher embodying my invention. Fig. 2 is a central vertical sectional view. Fig. 3 is a sectional view of a portion of the annular water distributing pipe, and Fig. 4 is a detached view of the device for regulating the water valve shown in sectional view to disclose the flexible diaphragm contained therein.

Similar reference letters and figures refer to similar parts in the different views.

My invention relates to an apparatus designed to be comprised within an escape flue carrying dust in suspension, such for example as the flue of a blast furnace, for the purpose of separating and catching any fine dust passing through said flue and it consists in the construction and arrangement of parts as hereinafter described and pointed out in the annexed claims.

Referring to the accompanying drawings 1 denotes a cylindrical shell inclosing a dust chamber 2 and having a bottom 3, preferably hopper shaped, and provided with an outlet opening 4 closed by a valve 5, pivoted to a lever handle 6, connected by a link 7 with a bracket 8 on the shell 1. Near the bottom of the dust chamber 2 and just above the hopper shaped bottom 3 is an inlet pipe 9 by which the dust chamber 2 is connected with the blast furnace or other coal consumer, and at the upper end of the dust chamber is an outlet pipe 10, preferably connected with a vertical stack. The inlet pipe 9 is arranged tangential to the dust catching chamber, so that an incoming current carrying dust through the inlet pipe 9 is carried in a circular path around the chamber 2 forming a rapid vortex, and causing the particles of dust to be carried by centrifugal force against the interior surface of the inclosing shell 1. Arranged at the upper end of the chamber 2 is an annular pipe 11 provided with a series of short outlet pipes 12 arranged at an oblique angle to the wall of the chamber, and which are gradually contracted in area to form re-

stricted nozzles 13 contiguous to the wall of the shell 1. The annular pipe 11 is connected by a water supply pipe 14 with a suitable source of water supply by which water is fed to the annular pipe 11 under pressure, and the flow of water through the pipe 14 is controlled by a valve 15, the stem of which is provided with a radial arm 16 having its free end connected by a link 17 with the free end of a lever 18 pivoted at the opposite end to a bracket 19 on a diaphragm case 20, containing a diaphragm 21 on which is supported a follower 22 having a stem 23 pivoted at its upper end to the lever 18.

The space below the diaphragm 21 communicates by a pipe 24 with the chamber 2, so that any pressure within the chamber 2 will be applied to the under side of the diaphragm 21 to lift the lever 18, and by means of the link connection 17 rock the water valve 15 to open the same and allow water to be supplied to the annular pipe 11. The pressure against the diaphragm 21 is counterbalanced by a spring 25 connecting the free end of the lever 18 with a fixed point. The lower end of the shell 1 is provided with an overflow pipe 26 which is turned upwardly at its outer end at 27 to determine the level of the water line formed by the accumulation of water in the bottom of the chamber 2, and also to bring the water line above the point of connection between the chamber 2 and the overflow pipe 26; so that the vertical column of water in the upturned end 27 of the overflow pipe 26 will serve as a water seal to resist the pressure within the chamber 2.

The operation of my apparatus is as follows:—The current of air or gas with contained dust enters the dust chamber 2 through the restricted inlet 9 tangentially to the chamber and passing in a circular current around the chamber finds its main exit through the outlet pipe 10. Water is admitted through the pipe 14 to the annular pipe 11 and is delivered through the nozzles 13 against the inner side of the shell 1 and preferably at an oblique angle thereto, by which the wall of the chamber 2 is kept wet and the continued supply of water running down the wall of the chamber serves to wash off the accumulation of dust and carry it into the hopper shaped bottom 3, from which it may be withdrawn through the opening 4. A body of water is maintained

in the hopper shaped bottom 3 by means of the water seal in the overflow pipe, the water line in the chamber being maintained at a point below the water line in the upturned end 27 of the overflow pipe due to the excess of pressure of the gases in the chamber 2 over the normal atmospheric pressure upon the water in the free end of the overflow pipe. The supply of water through the pipe 14 is regulated by the pressure within the chamber 2 by means of a diaphragm 21, so that any increased flow of the products of combustion from the furnace to the chamber 2 will tend to open the water valve 15 and increase the flow of water through the nozzles 13, thereby making the water supply correspond to an increased or decreased flow of gases through the chamber 2. The employment of a vortex chamber such as chamber 2, for the purpose of catching accumulations of dust is not new, and a similar device is already employed in wood working establishments, but the application of a liquid for the purpose of moistening the accumulation of dust carried by centrifugal force against the wall of the chamber, and applying the liquid so as to wash the inner wall of the shell 1, I believe to be broadly new, and I therefore do not wish to confine myself to the specific details of construction as herein described for the purpose of accomplishing this result.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a dust catcher, the combination with a single chamber having a vertical wall and a funnel shaped bottom, of a valve closing the lower end of said bottom, a tangential opening for the admission of a dust laden current immediately above said bottom, an opening at the top of said chamber for the exit of said current, and an annular pipe at the top of said chamber connected with a source of water supply and provided with a series of outlet pipes extending toward the wall of said chamber, and gradually contracted in area to form restricted nozzles contiguous to the wall of said chamber.

2. In a dust catcher, the combination with a cylindrical chamber having a vertical wall, of an inlet pipe tangential to said chamber arranged to admit a dust laden current under pressure near the bottom of said chamber, a restricted opening at the top of said chamber for the exit of said current, whereby a certain amount of pressure is maintained in said chamber, means for washing said vertical wall by a descending flow of water, and means for controlling the amount of said flow by the amount of pressure in said chamber.

3. In a dust catcher, the combination with a cylindrical chamber having a vertical wall and a funnel shaped bottom, of a valve for closing the lower end of said funnel shaped bottom, an inlet pipe tangential to said chamber for the admission of a dust laden current near the bottom of said chamber, an opening in the top of said chamber for the exit of said current, and an annular pipe at the top of said chamber provided with a series of outlet pipes extending from said annular pipe toward the wall of said chamber and arranged at an oblique angle to said wall.

4. In a dust catcher, the combination with a cylindrical chamber having vertical walls and a funnel shaped bottom, of a valve closing the lower end of said bottom, a tangential opening for the admission of a dust laden current immediately above said bottom, an opening at the top of said chamber for the exit of said current, means for supplying one or more jets of water against the inner side of the wall of said chamber near the top, means for regulating the supply of water to correspond with the change of pressure in said chamber, and an overflow pipe for said funnel shaped bottom, said overflow pipe being provided with a water seal.

Dated this fifth day of April 1904.

VICTOR E. EDWARDS.

Witnesses:

PENELOPE COMBERBACH,
RUFUS B. FOWLER.