

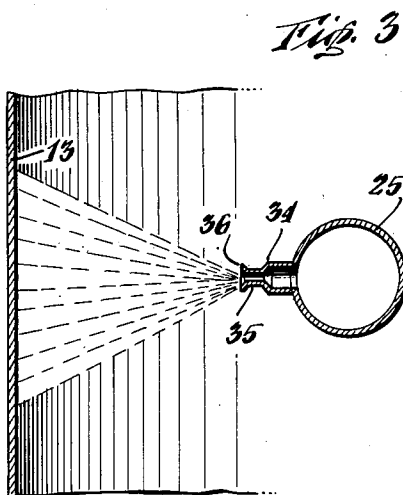
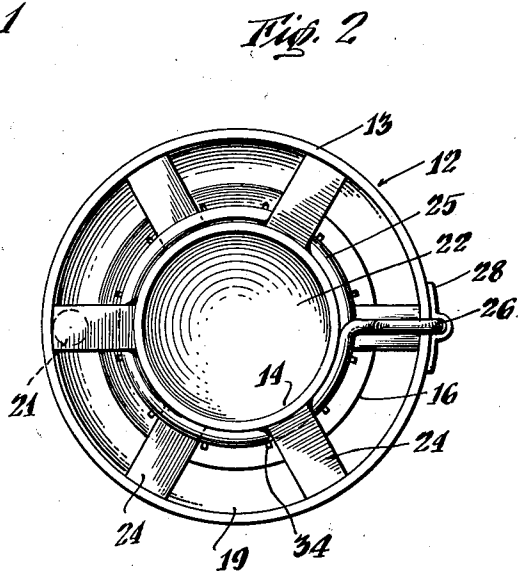
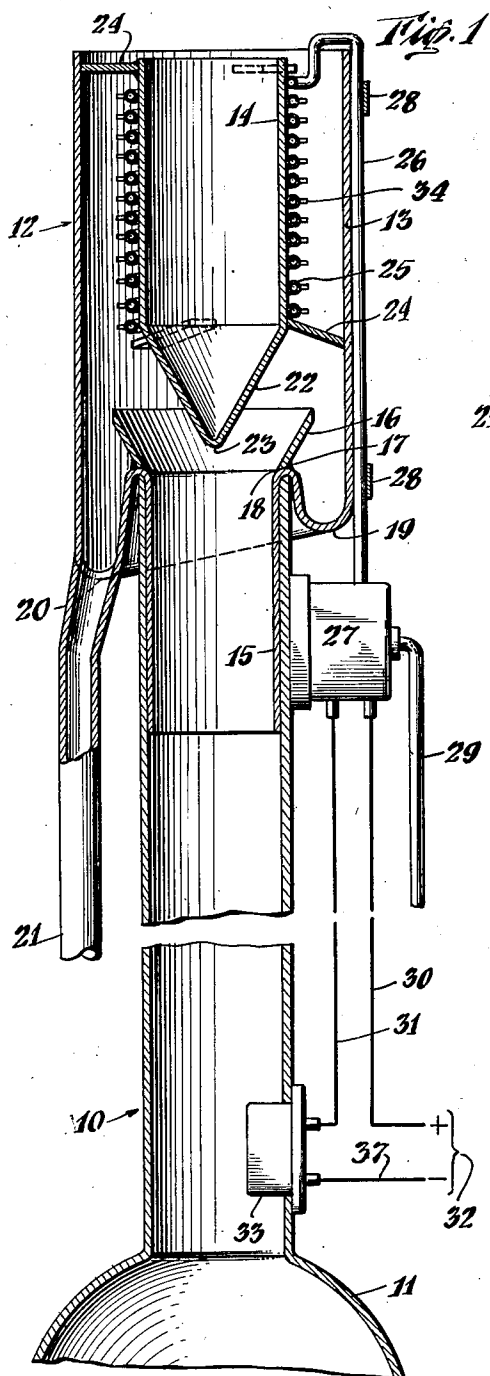
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SMOKE SEPARATOR

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SMOKE SEPARATOR

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My invention relates to a chimney smoke dissipating system, particularly to a smoke separator, and has for its primary object to provide an automatic arrangement for separating combustion particles and the like from gaseous parts of smoke.

Another object of the invention is to provide an arrangement for separating smoke particles only when the concentration of such particles is beyond a predetermined amount.

Still another object of the invention is to provide an improved and simple smoke eliminating device that is readily adapted for mounting on chimneys and smoke stacks.

With the above objects in view, one embodiment of my invention discloses a chimney in the upper portion of which is placed a smoke particle removing device comprising an outer cylindrical member having a funnel shaped lower element disposed within the chimney and an inner cylindrical member having a conical lower portion penetrating into the funnel for guiding the smoke between the two members. A liquid dispensing pipe having predetermined spaced openings is coiled around the inner member for emitting a fine spray of water under high pressure against the smoke, whereby the smoke particles are forced into a basin and carried away with the discharged liquid. The liquid pressure is developed by a pump under control of a smoke volume indicator, so that the device is operative only when required.

A more complete understanding of my invention will be obtained from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawing in which:

Fig. 1 shows an elevational view partly in section of my device adapted for mounting onto a chimney;

Fig. 2 shows a top plan view bringing out more clearly the interconnection between the inner and outer cylindrical members; and

Fig. 3 shows an enlarged sectional view of the pipe bringing out more clearly the spray nozzle.

Referring now to the drawing, particularly to Figs. 1 and 2, there is shown a conventional chimney or smoke stack 10 connected to a fuel consuming apparatus, such as a furnace 11 and the like, the products of combustion of which usually pass up through the chimney and into the atmosphere, which is contaminated thereby.

For eliminating the smoke particles from the products of combustion, generally called smoke, I provide at the upper portion of the chimney 10 a device 12 comprising an outer shell 13 and an inner shell 14, both of which are preferably cylindrical. It is understood, of course, that both shells may be of any suitable configuration. However, they should conform to the section of

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the chimney to which they are to be mounted, that is, if the chimney section is oblong, then the shell sections, particularly the outer section, should likewise be oblong.

At the lower end of the outer shell 12 is shown a tubular element 15, preferably integral therewith, which conforms in diameter or size to the inner dimension of the chimney 10 within which the element 15 is adapted to be disposed. A conically shaped element 16 is rigidly secured in any suitable manner, as by a weld 17, to the upper end 18 of the tubular element, thereby forming in conjunction therewith a funnel for upward passage of the smoke.

Between the upper end 18 of the tubular element 15 and the outer shell 13 is formed an annular basin or trough 19, which is sloped, as shown in Fig. 1, to concentrate the fluid, as will be described hereinafter, at a lowermost portion 20 thereof. A conduit or pipe 21 is connected to an opening provided in the portion 20 for delivering the fluid to a sewerage system. To prevent the sewer pipe 21 from being blocked a filter (not shown) for intercepting large particles may be placed in the basin 19.

The inner shell 14 is constituted by an open upper end and a closed, conically shaped lower end with walls 22 that converge to a point 23, which is disposed within the conically shaped element 16. The walls 22 and element 16 are preferably parallel. For rigidly securing the inner shell 14 to the outer shell 13, I provide flat braces 24, preferably three at the upper open end and three adjacent the lower end of the inner shell, each group of three being spaced angularly at 120° and all six braces being spaced at 60° intervals. These braces may be secured in any suitable manner, such as by welds, to both shells to form a unitary structure.

Around the peripheral surface of the inner shell 14 is shown coiled a conduit or pipe 25, which is connected to another pipe 26 that is run over the upper portion of the outer shell 13 and thence downwardly to a pump 27. The pipes 25 and 26 may be integral and may be supported to the shells in any suitable manner, brackets 28, shown more clearly in Fig. 2, being adapted for supporting the pipe 26 to the outer shell 13. Similar brackets (not shown) may be employed for supporting the pipe 25 to the inner shell 14. The pump 27 may be of a conventional type adapted for developing a high pressure, the pipe 26 being an outlet pipe and the inlet therefor being shown by pipe 29, which may be connected to a water main or suitable liquid source adapted for use therein.

The pump 27, which may be attached to the smoke stack 10 or placed upon a suitable support (not shown) near the upper end thereof, is preferably operated by electricity, being connected by

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wires 30, 31 to any suitable power supply 32. Serially disposed in the power supply circuit is shown a smoke volume indicator 33 of conventional type for determining the concentration of smoke particles in the smoke emitted by the furnace 11. A photoelectric smoke detecting device similar to that shown in Farmer et al. Patent #2,311,374 of February 16, 1943 may be employed to close or energize the electric supply circuit of pump 27 when the smoke particle concentration is too great. The smoke volume indicator 33 is preferably disposed near the bottom of the smoke stack 10, as shown.

Referring now, particularly to Fig. 3, there is shown a nozzle 34, which is provided upon the outer periphery of the coiled pipe 25. These nozzles 34 are spaced circumferentially at suitable intervals to provide an efficient dispersion of liquid spray. The invention is particularly directed to the fact that a high pressure is provided by the pump 27 to develop a very fine spray through the nozzles 34, which, as shown, comprise a restricted portion 35 with an expanding rim 36.

In operation, assuming that the smoke volume indicator 33 discloses a concentration of smoke particles above a predetermined optimal amount, the electric circuit constituting the leads 30, 31 and 37 will be closed through a circuit closing device (not shown) in the indicator 33 to operate the pump 27, which upon developing the proper liquid pressure will cause a very fine spray to be discharged from the pipe 25 through the nozzles 34 upon the smoke passing upwardly. This smoke as it reaches the upper end of the chimney 10 is separated by the conical portion 22 and is forced to pass between the inner and outer shells and through the spray emitted from the nozzles 34. The liquid spray striking the smoke will dislodge the solid smoke particles therefrom and cause them to be dropped into the basin 19 with the liquid, which, in turn, will descend through the pipe 21 for disposition in the sewer, or as desired.

It will thus be readily apparent that with my invention a substantial portion of the solid particles will be removed from the smoke before it passes into the atmosphere, thereby purifying the air with its beneficial health results to the populace.

While my invention has been shown and described as embodying certain features merely for the purpose of illustration, it is clear to anyone that many modifications are possible without departing from the spirit of the invention and the scope of the appended claims.

What I claim is:

1. A device for eliminating solid particles from smoke passing through a chimney comprising, in combination, an outer shell adapted to be carried at the top of the chimney, a funnel portion of said shell disposed within said chimney, said funnel portion being concentric with said outer shell, an inner cylindrical shell having a conical point rigidly secured to said outer shell, said conical point being concentric with said outer shell and penetrating within said funnel portion so as to direct the smoke in an annular path between the inner and outer shells, a helical conduit coiled around a substantial length of said inner shell, nozzles each with a restricted throat portion and expanding rim on said conduit adapted for discharging a fine liquid spray un-

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der high pressure across the path of said smoke, whereby the solid particles are separated therefrom, and a basin in said outer shell for catching the discharged liquid and solid particles.

2. A device for eliminating solid particles from smoke passing through a chimney comprising, in combination, an outer shell adapted to be carried at the top of the chimney, a funnel portion of said shell disposed within said chimney, said funnel portion being concentric with said outer shell, an inner cylindrical shell having a conical point rigidly secured to said outer shell, means for interconnecting said inner and outer shells, said conical point being concentric with said outer shell and penetrating within said funnel portion so as to direct the smoke in an annular path between the inner and outer shells, a helical conduit coiled around a substantial length of said inner shell above said conical point, nozzles each with a restricted throat portion and expanding rim on said conduit adapted for discharging a fine liquid spray under high pressure across the path of said smoke, whereby the solid particles are separated therefrom, and a basin in said outer shell for catching the discharged liquid and solid particles.

3. A device for eliminating solid particles from smoke passing through a chimney comprising, in combination, an outer shell adapted to be carried at the top of the chimney, a tubular funnel portion of said shell in abutting engagement with the inner walls of said chimney, said funnel portion being concentric with said outer shell, an inner cylindrical shell having a conical point rigidly secured to said outer shell, means for interconnecting said inner and outer shells, said conical point being concentric with said outer shell and being adapted to penetrate within said funnel portion so as to direct the smoke in an annular path between the inner and outer shells, a helical conduit coiled around a substantial length of said inner shell, a plurality of nozzles having restricted passages carried by said conduit for discharging a fine liquid spray under high pressure across the path of said smoke, whereby the solid particles are separated therefrom, and a sloping basin in said outer shell for catching the discharged liquid and solid particles, said basin having an outlet at the lowermost portion thereof.

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