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CHIMNEY TOP

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ROBERT H. THULMAN,

Hall + Houghton

**ATTORNEY**

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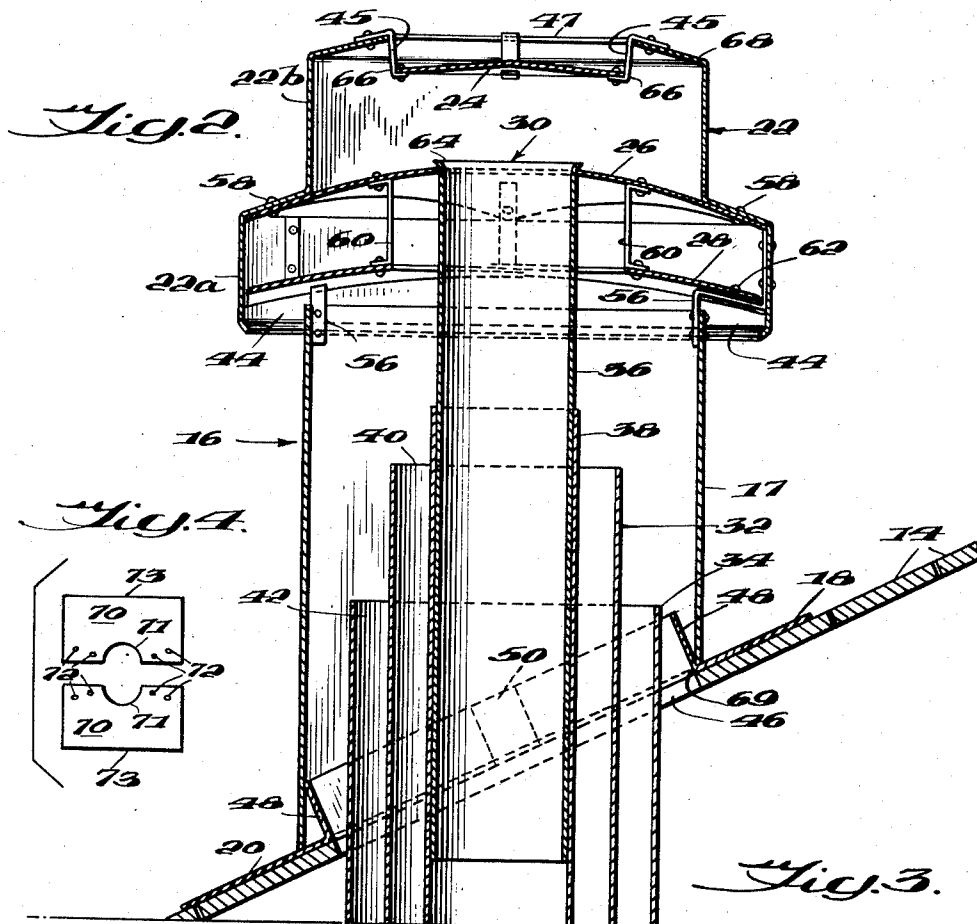
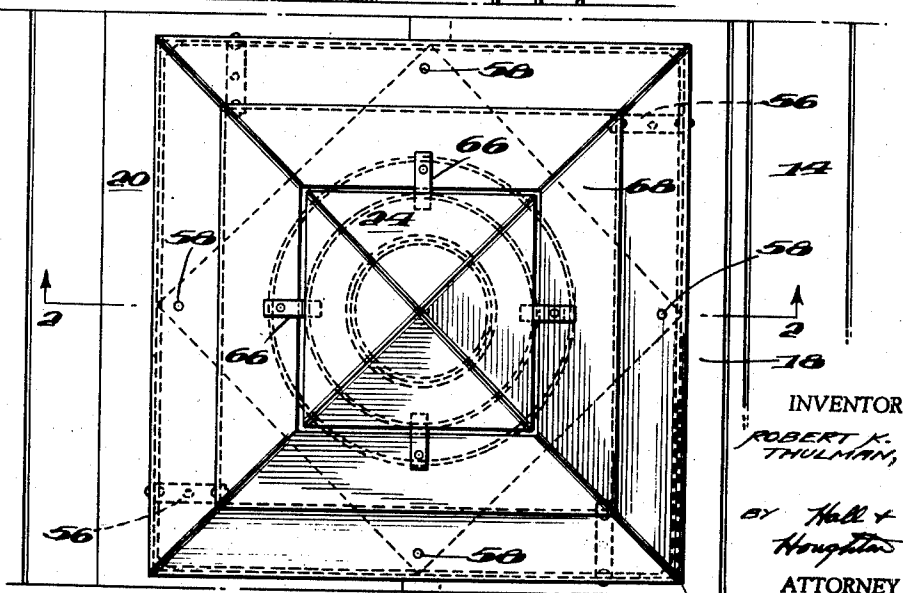
R. K. THULMAN

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2,856,837

## CHIMNEY TOP

Robert K. Thulman, Silver Spring, Md.

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9 Claims. (Cl. 98—46)

This invention relates to the art of chimney construction and more particularly to a chimney top. The invention may be most conveniently employed in conjunction with a chimney of the type described and claimed in my prior Patent No. 2,634,720, issued April 14, 1953, for "Chimney Construction With Heat Transfer Controlling Means," but the principles of the invention are applicable to other chimneys as well. In Fig. 1 of my aforesaid patent a chimney is described which includes a central flue and a pair of concentric thermosyphon air circulation ducts arranged about the flue, the flue and ducts communicating with the atmosphere at their upper ends in such a way that the draft in the flue does not cause aspiration of air through the ducts, there being a housing enclosing the upper ends of the ducts for preventing rain from entering the same, and within which said ducts communicate with the atmosphere, this arrangement providing for partial recirculation of the air if desired.

Chimneys of the prior art are subject to many defects, among which are the difficulty of preventing rain from entering the flue without interference with proper action of the chimney. While there are rain cap devices in the prior art which have been reasonably successful in preventing rain from entering the flue, such devices are generally unsightly and interfere with the free flow of flue gases. Moreover, because such devices are placed in the path of the flue gases, soot and ash deposits collect upon them, and when it rains, these deposits are carried down the outer sides of the chimney, causing ugly stains.

It is a principal object of the present invention to obviate defects of the prior art by preventing rain from entering the flue of the chimney and by avoiding soot and ash stains at the top of the chimney, while still providing a relatively free path for the flow of flue gases. When employed in conjunction with the chimney of my aforesaid prior patent, the invention also prevents rain, soot and ash from entering the concentric ducts and provides for the free interchange of air between the ducts and preferably for the ventilation of the space below the roof. The unique chimney top of the present invention is not only functional, as indicated above, but also serves as an ornamental housing for the top of the chimney. In addition, the invention is economical and simple to construct and install.

Briefly, the foregoing objects of the invention are accomplished by providing a chimney top including an outer housing, unique baffle means, and a rain cap. The housing is joined to the roof so as to provide a watertight junction and supports the baffle means and rain cap. Suitable paths are provided for the flow of flue gases, while the baffle means are arranged to protect the concentric ducts associated with the chimney from rain, soot and ash and in fact to direct rain which enters the housing so that most of it drips onto the roof but does not run down the sides of the chimney housing.

The foregoing and other objects of the invention will be made more readily apparent by the following de-

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tailed description of an illustrative embodiment of the invention as exemplified in the accompanying drawings, wherein:

Fig. 1 is a perspective view of the illustrative embodiment, partially broken away, as seen in a typical roof top installation;

Fig. 2 is a vertical section thereof taken along line 2—2 of Fig. 3;

Fig. 3 is a plan view thereof; and

Fig. 4 is a disassembled plan view illustrating an alternative form of baffle on a reduced scale.

As shown in Fig. 1 of the drawings, the chimney may be installed on a typical sloping roof generally designated 10, having a ridge 12, and comprising suitable sheathing exemplified by wooden planks 14. In the state of construction illustrated, the final roofing, for example, asphalt or other conventional material, has not been applied. The chimney top housing 16 is arranged vertically with its lower end truncated on a plane determined by the slope of the roof (see Fig. 2) and supported on flashing members 18, 20, described in more detail hereinafter. Housing 16 has a lower or body portion 17, and is provided with an upper or cap portion comprising a rain and wind shield 22, a rain cap 24, and baffle means 26, 28. In the form shown, the chimney top is employed in conjunction with the chimney of my aforesaid prior patent, which includes a central flue 30, an inner casing 32, and an outer casing 34, and the body portion 17 corresponds with the casing 14 of my prior patent, while the elements 22 and 24 perform the function of the cap 15 of my prior patent as well as additional functions.

Referring more particularly to Fig. 2, in the form shown flue 30 comprises an upper section 36 which telescopes into a lower section 38. The bottom end of section 38 may communicate with a heating device, such as an oil or gas fired furnace or a fireplace. Inner casing 32 is spaced from and defines with flue section 38 an inner duct 40, and outer casing 34 is spaced from and defines with inner casing 32 an outer duct 42. The inner duct terminates before the end of flue 30, while the outer duct terminates before the end of the inner duct, and the draft of the flue does not aspirate air through the ducts. In other words, the ducts as well as the flue each communicate with the atmosphere at their upper ends, since the space within housing 16 is open to the outside air by virtue of a lower air passage 44 at the bottom of shield 22 and an upper air passage 45 between the rain cap 24 and the shield as well as by way of the spaces between baffle 28 and the flue and between baffle 26 and the wind shield 22, while in the form shown, such housing space is also open to the attic space through the opening at 46 between the rectangular flashing 18, 20, and the cylindrical outer casing 34. The upper portion or cap 22 of housing 16 preferably comprises a skirt 22a extending laterally beyond the lower portion 17, and is spaced from the top edge of the lower portion so as to define the passage 44. In the preferred form, only the bottom section or skirt 22a of the shield 22 extends beyond the lower housing portion, preferably depending somewhat below its upper edges, as shown. The bottom section or skirt 22a may be surmounted by an upper section 22b that preferably has lateral dimensions substantially the same as lower portion 17.

The flue and the ducts 32 and 34 pass through a hole 46 formed or cut in the roof sheathing 14, and the chimney top housing may be mounted entirely above the roof level, as illustrated in Fig. 2. In the form shown, hole 46 is rectangular and the corresponding hole formed by the flashing members 18, 20 is also rectangular. The flashing members may be formed with upwardly extending collar portions, which may overlap as indicated at

50 when the flashing is installed so as to define a collar 48 surrounding hole 46. The flat portions of the flashing members may also overlap as indicated at 52 in Fig. 1. A typical method of installation will be set forth in detail hereinafter; suffice it to say for the present that housing 16 may be supported on the flashing and the roof sheathing by a plurality of angle brackets 54, two of which are illustrated in Fig. 1; shield or cap 22 may be supported on housing portion 17 (as illustrated in Fig. 2) by a plurality of Z-shaped brackets 56, which may be riveted or bolted to the upper and lower housing portions; and rain cap 24 may be supported on shield 22 by a plurality of Z-shaped brackets 66, which may be riveted to one of these members and bolted to the other so that the cap may be readily removed (see also Fig. 1). The top of the shield 22 may be formed with an inwardly turned lip 68, which cooperates with rain cap 24 in obstructing the entrance of rain to housing 16, and in the preferred form the upper end of the housing 16 is formed with a central opening 47 constituted by the inner edge of the lip 68, the rain cap 24 being suspended below this opening and above flue 30, with the periphery of the rain cap 24 spaced from lip 68 so as to define air passage 45, the lateral dimensions of the cap being sufficient to ensure shielding of the flue opening.

Baffles 26 and 28 may be supported in many ways. For example, baffle 26 may be riveted or bolted to shield 22, as indicated at 58, and baffle 28 may be suspended from baffle 26 by a plurality of U-shaped brackets 60 riveted or bolted to the respective baffles. Alternatively, or additionally, baffle 28 may be supported by the Z-shaped brackets 56 riveted or bolted to the baffle as indicated at 62. Of course, if baffle 28 is supported by brackets 56, the rivets or bolts at 58 may be omitted, and baffle 26 may be mounted on baffle 28 by brackets 60.

Each baffle is preferably formed with a central aperture to receive upper flue section 36. The aperture in the lower baffle 28 may have a substantially larger diameter than the outer diameter of section 36 so as to allow air beneath the lower baffle 28 to pass between the baffles. The aperture in the upper baffle 26 may be just large enough to accommodate flue section 36. The upper flue section 36 may then be supported by suspension in baffle 26 by virtue of an enlarged or flared end portion 64.

As shown in Figs. 1 and 2, the upper surface of rain cap 24 preferably slopes downward from its center, and in the form shown has a substantially pyramidal shape. The upper surface of baffles 26 and 28 also slope downward from the center, and the upper contours of the baffles may be substantially alike. The outline of the baffles as seen in plan is preferably polygonal and may be substantially rectangular as shown in Fig. 3, and the baffles are preferably arranged with the corners of one interposed between the corners of the other, as shown in Figs. 1 and 3. The outline of the lower baffle preferably conforms approximately to the outline of the enlarged upper housing portion, and the baffle extends into this portion with its periphery spaced slightly inwardly from the upper housing portion. The lower baffle extends laterally beyond the lower housing portion so that its periphery lies outside this portion, but preferably terminates in spaced relation to the skirt 22a, as shown. Upper baffle 26 may be smaller than lower baffle 28, and its corners may extend into the enlarged upper housing portion so as to be secured thereto as indicated previously. At least the bottom section of the upper housing portion is large enough to accommodate the baffles. The upper baffle extends laterally beyond the central opening in baffle 28 an amount sufficient to ensure shielding of the ducts, but at least part of the periphery of the upper baffle is spaced from the inside of shield 22 so as to continue the air passage afforded by the opening in the lower baffle

and to allow rain to drip from the upper baffle onto the lower baffle.

The upper surface of the baffles is preferably conoidal, which includes both conical and spherical shapes. However, other surfaces shaped to direct water from the center toward the outer extremities of the baffles may be employed. For simplicity, the baffles have been cut so as to have four corners, but it will be evident that other outlines may be employed. The baffles may be curved to the contour illustrated by cutting and dishing flat stock in a suitable press as indicated in Figs. 1-3. Alternatively, as shown in Fig. 4, each may be formed from two generally rectangular pieces 70 each having a substantially semi-circular cutout 71 along one side thereof, by mating the semi-circular portions oppositely, deforming the flat sheets into a generally conical shape so that the straight edge portions adjoining the semi-circular portions overlap, and securing such lapped portions together in any suitable way, as by riveting at the parts 72. This form of construction produces a baffle the sides 73 of which bow slightly outwardly at the center, while the overlapped sides also are not quite straight, in plan view, but by virtue of the considerable projection of the baffle edges over the space between the housing 17 and the skirt 22a, the rain and soot disposition are substantially as hereinafter described. Each baffle may also be formed from a single more or less 5-sided flat sheet of material with a generally keyhole shaped slot diverging toward one edge of the sheet. If the diverging straight edges of the slot are drawn together and overlapped, the sheet will assume a generally conical shape with the circular portion of the slot forming the opening for flue 30 and with a generally square periphery in plan view. If the periphery of the flat sheet has straight sides to begin with, the sides will be bowed outwardly when the baffle is formed in this manner. If it is desired to have straight sides (as seen in plan), the sides must be cut concavely before the bending process begins. As the sheet is bent, the corners formed by the intersecting sides will curve downwardly, thereby making the corners the lowest portions of the baffles, as shown in Fig. 1.

With the chimney top assembled as illustrated, the upper extremity of flue 30 will be protected from rain by rain cap 24 and the cooperating lip 68 of shield 22. The upper extremities of ducts 40 and 42 will similarly be protected by baffles 26 and 28. The side surfaces of shield 22 and lower housing portion 17 serve to prevent rain from entering the flue and ducts from a sideward direction. Rain which strikes the upper surface of rain cap 24 runs toward the edges of the rain cap by virtue of the contour of its upper surface and drips onto baffle 26. Rain and drip striking the upper surface of baffle 26 run toward the corners of the baffle since, as described above, the corners are preferably the lowest points on the baffle surface. If the corners of baffle 26 are drawn up snugly against the inside of shield 22 as shown in Fig. 2, the rain will drip from baffle 26 to baffle 28 when it reaches the shield. Any rain which strikes the upper surface of baffle 28 is similarly directed toward its corners and drips therefrom onto the roof. Finally, any rain that runs down the inner wall of section 22a can drip therefrom to the roof. It will thus be observed that the rain water is directed so as to drip onto the roof rather than to run down the outside of the housing 16. In this manner any soot and ash picked up by the rain is largely prevented from staining the outside of the chimney top. Soot and ash may collect on the rain cap, baffle and shield but will be prevented from entering the ends of ducts 40 and 42. The ducts will thereby be maintained free of soot and ash deposits, which in the absence of such protection could seriously interfere with the free flow of air through the ducts.

As described in my aforesaid prior patent, in operation of the chimney, the hot flue gases in flue 30 causes a thermosiphonic flow of air in ducts 40 and 42, with air

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passing downwardly from the atmosphere in duct 42 and upward to the atmosphere in duct 40. The chimney top construction described does not interfere with the thermosyphonic circulation of air in ducts 40 and 42. In addition, in the form shown, the chimney top provides for attic ventilation as set forth in my aforesaid patent, the attic air passing upward in the spaces between square collar 48 of the flashing and the circular area of the outer casing 34. In summer, this air will rise upwardly and exhaust through passages 44 and 46 in the chimney top, while in winter, when avoidance of condensation is particularly desirable, the air may also pass downwardly into duct 42 by virtue of the thermo-syphonic flow.

The chimney top may be installed quite simply. A rectangular hole of the proper size (which may be approximately 17" x 17") is located on and cut through the roof sheathing. Headers may be provided if necessary. The lower inside edge of the upper flashing section 18 is aligned with the upper edge of the roof opening as illustrated in Fig. 2 at 69. The upper brackets 54 (one on each side of the flashing) are arranged as in Fig. 1 and screws are driven through the horizontal legs of the brackets into the sheathing so as to secure the brackets and flashing to sheathing. Wooden blocking members may be employed to back up the sheathing so as to ensure that the brackets are tightly held. The bottom flashing section is then slid inside and under the top section until its inside lower edge lines up a few inches above the lower edge of the roof opening. The collar portions will then overlap with the collar portion of the lower flashing section inside the corresponding collar portion of the upper flashing section so as to form collar 48. The chimney then may be installed, section by section, until the flue and ducts extend through the hole in the roof. The chimney top housing 16 is cut to an appropriate length with its lower edges conforming to the pitch of the roof with the chimney housing vertical. The length of the housing is selected so that the top of the housing extends approximately 2 feet above the ridge 12 of the roof when the housing is installed. The housing is tilted back toward the ridge and then lowered over the flashing so that the sides of the housing lie between the upper pair of brackets 54 and the collar 48. The housing is then brought to vertical position so that the sides of the housing lie between the brackets and the collar of the upper and lower flashing sections. The lower flashing section is then drawn down the roof slope until its upper edge rests against the inside of the housing 16. The lower pair of brackets 54 is then secured by placing the vertical legs of the brackets against the sides of housing 16 and driving screws into holes provided in the lower legs of the brackets through the flashing section 20, sheathing 14, and into the rafters or blocking. Housing 16 is then secured to the vertical legs of brackets 54 by sheet metal screws which are driven through holes provided in the vertical bracket legs. The telescoping flue section 36 may then be inserted through the opening 47 at the top of shield 22, through baffles 26 and 28, and into lower flue section 38 until the flared end 64 of the upper flue section rests on baffle 26. The rain cap 24 is then secured to the top of shield 22 as by bolts or screws. The chimney top can be painted or pre-painted, or otherwise finished to harmonize with the building design, and roofing material may then be installed in the conventional way so as to overlap the flashing sections 18 and 20.

Any suitable materials may be chosen for the construction of the chimney top and its components. For example, the smoke flue may be composed of stainless steel, enameled steel or aluminized steel; the housing, shield, baffles, rain cap, etc. may be composed of aluminum, aluminized steel, or galvanized steel. While the outer casing has been illustrated as rectangular, it will be appreciated that a cylindrical, oval, or other convenient configuration may be employed. The relative proportions of the parts of the chimney top may be varied within

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wide limits so long as the dimensions are commensurate with the functions described previously. The invention is also described in the "Report on Fireplace and Flue" issued by the Underwriters' Laboratories, Inc., miscellaneous hazard report 6018, July 14, 1954 (copy attached to and forming a part of the record in my application S. N. 479,131, filed December 31, 1954), which is herein incorporated by reference. Construction details and dimensions are set forth in said report, as well as test procedures and results.

A preferred form of the invention has been described and illustrated, but it is to be understood that the invention is not to be considered as limited thereby, that changes may be made in the arrangement and proportion of parts, and that equivalents may be substituted without departing from the spirit and scope of the invention.

It is, therefore, to be understood that the exemplary embodiments are illustrative and not restrictive of the invention, the scope of which is defined in the appended claims, and that all modifications that come within the meaning and range of equivalency of the claims are intended to be included therein.

I claim as my invention:

1. In combination with a chimney flue, a chimney top comprising a housing adapted to be mounted substantially upright above a roof and to enclose the end of said chimney flue, said housing comprising upper and lower tubular portions, means for supporting said upper portion in spaced relation to and above said lower portion, a rain cap mounted in the upper portion of said housing above said flue end, said housing having an opening above said cap for egress of flue gas, and a baffle supported by said housing below said rain cap, said baffle having a central opening of a size sufficient to accommodate said flue and form a passage between said baffle and said flue, said baffle being positioned in spaced relation to and above the top edge of said lower portion of said housing to provide an air passage between said baffle and said lower portion, said baffle extending laterally beyond the area of the lower portion, whereby rain water drips from the periphery of said baffle beyond the outside surface of the lower portion of said housing.

2. A combination in accordance with claim 1, including a second baffle arranged in said housing spaced above the first-mentioned baffle with said flue passing through said baffles in succession, said baffles each having an upper surface which slopes downwardly from said flue toward the baffle periphery, at least a portion of the periphery of each baffle being within and spaced from the inside of the upper portion of said housing, the periphery of each baffle being substantially polygonal, and the corners of each baffle being the lowermost points thereon and extending laterally between adjacent corners of the other baffle.

3. A combination in accordance with claim 1, said baffle having a downwardly sloping surface with a polygonal periphery, the corners of said baffle being the lowermost points thereon and extending laterally farthest outside the lower portion of said housing.

4. In combination with a chimney flue, a chimney top comprising a housing adapted to be mounted substantially upright above a roof and to enclose said chimney flue, said housing comprising a lower tubular portion terminating below the upper end of said flue and an upper tubular portion terminating above said flue end, means for supporting said upper portion in spaced relation to and above said lower portion with the bottom edge of said upper portion extending laterally beyond and surrounding the top edge of said lower portion so as to define an air passage therewith, said upper portion having an opening at its top, a rain cap mounted in said upper portion below said opening and above the upper end of said flue, a first baffle through which said flue passes mounted within said upper portion below said rain cap and extending

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laterally in said upper portion, a second baffle through which said flue passes mounted inside said upper housing portion below said first baffle, at least a portion of the periphery of said first baffle being spaced from the inside of said upper portion and spaced inwardly of the corresponding peripheral portion of the second baffle, whereby rain water may drip therefrom onto said second baffle, and at least a portion of the periphery of said second baffle being spaced from the inside of said upper portion but extending laterally beyond the area of the lower portion, whereby rain water may drip from the periphery of said second baffle beyond the outside surface of the lower portion of said housing.

5 5. A combination in accordance with claim 4, said second baffle having an aperture forming an air path therethrough around said flue.

10 6. A combination in accordance with claim 4, said baffles being conoidal and having an upper surface sloping downward from said flue.

20 7. In combination with a thermo-syphonic chimney having a flue and a pair of concentric ducts therearound and adapted to pass through a hole in a roof with the outer duct spaced from the periphery of said hole, a chimney top comprising a tubular housing adapted to be mounted upright on said roof and to surround said flue and ducts but spaced therefrom, said housing having an opening at its lower end adapted to surround said roof hole and an opening to the atmosphere at its upper end, a rain cap mounted on said housing above the end of said flue and aligned with and spaced from said opening to the atmosphere, said rain cap extending laterally beyond said flue end so as to shield the latter, a first baffle mounted in and extending laterally in said housing, said flue passing snugly through an aperture in said baffle, a second baffle mounted in said housing below said first baffle, said flue passing loosely through an aperture in

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said second baffle, said housing having an opening to the atmosphere below said second baffle and having an air passage past said first baffle near the periphery thereof.

8. A combination in accordance with claim 7, including flashing adapted to be secured to said roof around said hole and having an upwardly extending collar adapted to surround said hole and extend into said housing.

10 9. In combination with a chimney flue, a chimney top comprising a housing having an opening at its lower end to receive said chimney flue and an opening at its upper end to the atmosphere, said housing comprising a lower tubular portion and an aligned upper tubular portion, means for supporting said upper portion in spaced relation to and above said lower portion, the bottom edge of said upper portion being spaced laterally outward from the top edge of said lower portion so as to define an air passage therewith, and a baffle mounted in said upper portion extending in said upper portion laterally beyond said lower portion and having an aperture to receive said flue, said flue including an upper section supported by said baffle and telescoping with a lower section, said upper flue section having an upper end of larger lateral dimension than said baffle aperture, whereby said upper flue section may be suspended from said baffle.

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