March 8, 1955 W. J. WOODHAMS 2,703,520

ROOF STACK

Filed March 12, 1951 2 Sheets-Sheet 1

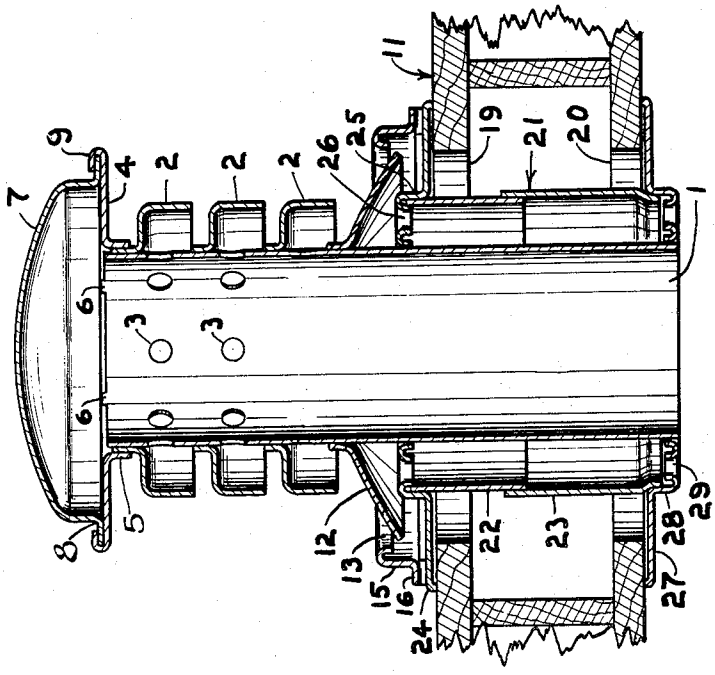


FIG-2

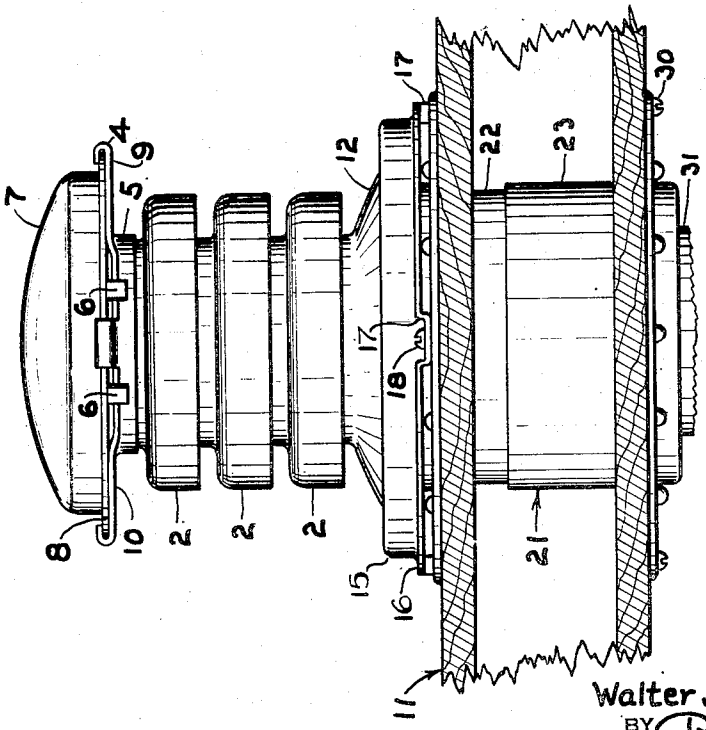


FIG-1

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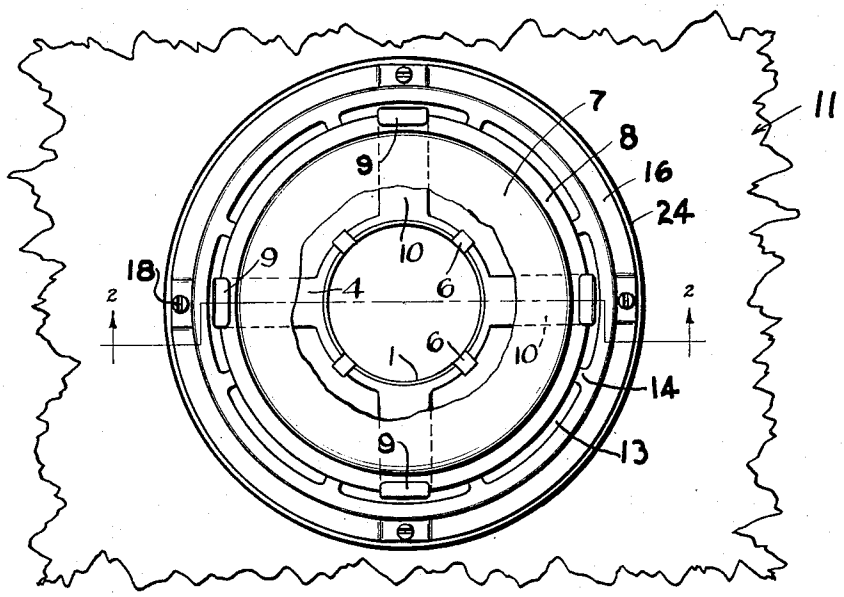


FIG-3

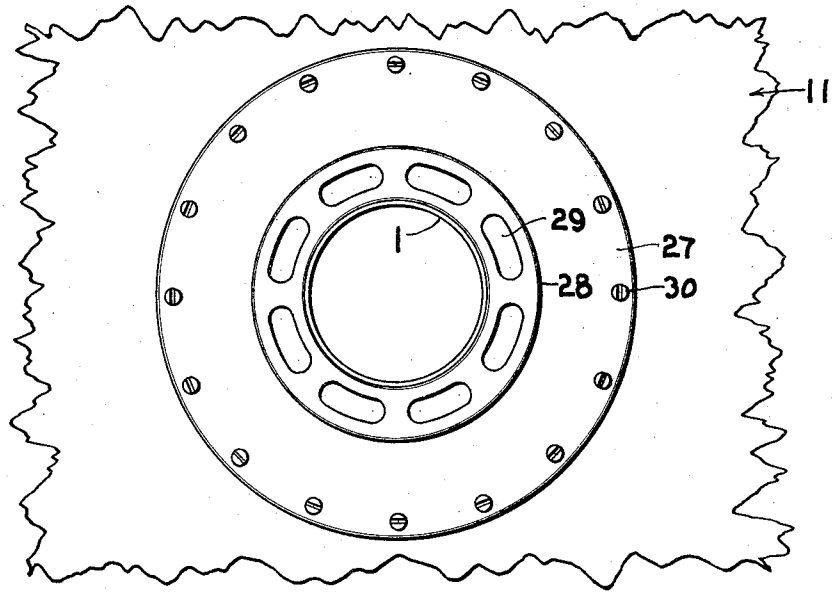


FIG-4

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ROOF STACK

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6 Claims. (Cl. 98—46)

The present invention relates broadly to gaseous fluid discharge apparatus, and in its specific phases to a vertically mountable roof stack in the form of a combined ventilator and chimney.

While hooded roof stacks have been made in many forms, there have been many common defects in them. For instance if the hood is placed close to the end of a plain roof stack, there is a choking action, and if it is placed high above the end of the roof stack on which it is mounted, so as to avoid this choking action, rain can blow under it and pass down the chimney. These types of construction are also inherently subject to downdrafts which not only interfere with the burning of the fire in a heater connected to same but many times causes a smoking condition at the heater. Moreover some of these devices are only suitable for ventilating an attic or like space, or only as a chimney hood, and not to efficiently meet both problems with increased safety by means of a single piece of apparatus. The need of something to safely and efficiently meet these two problems is especially prominent in house trailers. There the chimney is relatively short, and additionally some means of ventilation of the house trailer interior as well as protection of the roof from fire hazard is essential under both standing and towing conditions. It was a recognition of the shortcomings and limitations of such prior art which led to the conception and development of the present invention.

Accordingly among the objects of the present invention is the provision of a new type of ventilator and roof stack which not only gives decidedly improved performance but has an attractive exterior tiered design.

Another object is to provide a chimney extension member or roof stack which not only has a wide hood carried by a suitable spider on the upper end of the chimney pipe but also has circular downturned louver members which are closed at their top and open at their bottom and under which the chimney pipe is perforated for escape of smoke or the like.

Another object is to provide a chimney extension or roof stack with hooded upper end mounted on an open spider, and wherein the upper portion of the chimney pipe is perforated so that there is ample outlet area through same and under said hood for free flow of products of combustion out of said chimney regardless of whether there is a strong cross wind or no wind is blowing.

Another object is to provide a chimney construction with louvered bottom-opening, substantially straight sided, members with perforations under same so that when there is a cross wind any of that wind which passes through said perforations has to pass under the louvered members and in a generally upward direction through the perforations on the windward side of the chimney which thus makes the general flow direction upward in the chimney which in turn eliminates downdrafts.

A further object is to provide a chimney construction wherein the upper end of same is provided with a spider mounted hood which opens downward outside of and substantially at the top of the chimney and wherein there are side openings into that chimney pipe which are covered by downwardly opening substantially vertical sided louver members so that there is no direct access of rain into the chimney.

A further object is to provide a chimney member

which has the added capability of ventilating a space adjacent the outer surface of that chimney where it passes through a panel, such as a roof panel.

A further object is to provide a combined ventilator and chimney adapted to pass through a roof panel or the like, and wherein same is of telescoping construction to meet the requirements of varying thickness roof panels.

A further object is to provide an annular air space around the chimney pipe in the area extending through the roof panel so that hot products of combustion passing up the chimney will induce, through radiated heat, a ventilating flow of air through this annular passageway into a sheltered and vented outlet above the roof line.

A still further object is to provide a construction wherein there are two air spaces through the roof panel with the inner one adjacent the chimney being annular and acting to conduct heat radiated from the chimney by way of air flow so that the outer surface of this annular air space is maintained relatively cool, and with heat radiated from the outer surface of said space passing into a second air chamber with drastically minimized danger of overheating the roof panel.

A further object is to not only provide a telescoping annular top and bottom open-ended ventilation passageway around the chimney of a roof stack but also to provide that roof stack with a roof flange and a sheltering louver of circular construction open at its bottom and wherein that roof flange has drainage areas so that under rainy weather conditions such rain will not pass into the upper end of the annular ventilating passageway, but rather will be drained onto the top of the roof flange from whence it will flow out onto the roof.

A further object is to provide a combined ventilator and chimney stack in the form of a roof stack which is not only safer, but more efficient than roof stacks of the ordinary construction.

Still further objects and advantages of the invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the gaseous fluid dicharge apparatus hereinafter fully described and particularly pointed out in the claims, the annexed drawings, and the following description setting forth in detail certain means for carrying out the invention, such disclosed means illustrating, however, but one of various ways in which the principle of the invention may be used.

In the annexed drawings:

Figure 1 shows a side view of a preferred form of the roof stack of the present invention mounted on a hollow roof panel which is shown in section.

Figure 2 shows a vertical center-sectional view of the apparatus as viewed along line 2—2 of Figure 3 looking in the direction of the arrows.

Figure 3 shows a top view of the assembly shown in Figure 1, but with a portion of the hood member broken away to show details of the spider mounted in place on the upper end of the chimney pipe.

Figure 4 shows a bottom view of the assembly shown in Figure 1.

Referring more particularly to Figures 1 and 2 of the drawing it will be noted that the assembly has a chimney pipe 1 with downturned, open-bottom, substantially vertical sided louver members 2. The downturned side portion of said louver members acts as a baffle for a portion of any cross wind present, which may be natural or even created by towing a vehicle on which the assembly is mounted. That baffling helps to retard air pressure which might create downdrafts. The louver members are mounted on the upper portion of the chimney with perforations 3 in said chimney being sheltered by said louver members and preferably wholly above the lower edge of same. These perforations are preferably of a total area less than half of the area of the chimney pipe covered by the louver in order to reduce choking effect under strong cross winds. Mounted on the upper end of chimney-pipe 1 is a spider 4, the lower portion of which is in

the form of a sleeve 5 which tightly fits over the upper end of chimney-pipe 1 and is anchored thereto by means of outwardly extending downturned tabs 6 on the upper end of chimney-pipe 1. An upwardly domed hood 7, which preferably has relatively straight sides and a radially extending bottom flange 8, and which is of a considerably larger diameter than chimney-pipe 1, is adapted to be placed with open end down on top of spider 4, the outer ends 9 of which are preferably bent backward over flange 8 to anchor hood 7 thereon. This provides free flow of products of combustion up through chimney-pipe 1 and out from in under hood 7 between spokes 10 of spider 4.

Mounted on chimney-pipe 1 above roof panel 11 of the compartment on which the assembly is to be mounted, is a special flanged drainage louver 12. The upper end of that louver fits tightly around chimney-pipe 1 and tapers downward and outward therefrom to a series of openings 13 which are spaced apart by spider-like members 14, Figure 3, which connect the downwardly and outwardly tapering portion of the drainage louver to a vertical flange portion 15, Figure 2, terminating in a horizontal flange portion 16. At intervals in said horizontal flange portion 16 there are depressed portions 17 which hold flange 16 in elevated position while permitting screws 18 to be used for anchoring the assembly to the upper face of the roof panel 11.

Roof panel 11 has upper and lower openings 19 and 20 therethrough as shown in Figure 2. Passing through openings 19 and 20 of roof panel 11 is a telescoping sleeve assembly 21. This telescoping sleeve assembly has an upper sleeve 22 adapted to telescope into lower sleeve 23. The upper sleeve 22, which is of sufficiently larger diameter than chimney-pipe 1 to form an annular air space therebetween, is fastened at its upper end to upper roof flange 24 in conventional manner, such as by spot welding. The inner portion 25 of that roof flange is turned upward to form a continuous shoulder and at the upper edge of that shoulder this roof flange is turned inward with its innermost edge rounded to tightly fit and be slidable on chimney-pipe 1. A series of perforations 26 are placed in this inturned flange portion of upper roof flange 24 to provide free air-flow therethrough from the annular space between chimney-pipe 1 and upper sleeve 22. The outer edge of upper roof flange 24 is preferably turned downward slightly to provide a better grip on the roof when same is tightly fastened in place as by means of screws 18, and any other like screws which would normally be used the same as is shown in connection with lower roof flange 27 which is substantially identical with upper roof flange 24.

Lower roof flange 27 is fastened to lower sleeve 23, Figure 2, at its inwardly offset lower edge, in any conventional manner, such as by spot welding. This lower roof flange 27 is provided with a downturned shoulder portion 28 which in turn is flanged inward to chimney-pipe 1 with the contacting edge rounded for ease of sliding thereon. This portion of the lower roof flange is also provided with perforations 29, which are substantially identical with perforations 26 in upper roof flange 24. The telescoping assembly 21 is thus readily adjustable to a considerable variation in roof panel thicknesses and such lower panel is also adapted to be anchored to the roof panel by means of screws 30.

The combined ventilator and chimney assembly, as described, is thus admirably adapted for connecting to a suitable heating stove or other device (not shown) by means of a stove pipe 31, Figure 1. That ventilator and chimney assembly is thus obviously easy to manufacture and install. Moreover it involves an entirely new principle of stove venting equipment which not only prevents downdrafts but has all openings in the upper portion of same sheltered against direct access by rain while providing not only for venting a stove, or the like, but also ventilation of the interior of the house trailer, or the like, of which roof panel 11 forms a portion. Such interior ventilation is facilitated by the heat carried through chimney 1 by the hot products of combustion from the stove. That heat causes an updraft in the annular space between chimney 1 and sleeves 22 and 23 of the telescoping assembly, and those sleeves, in turn, also act as a heat shield to retard flow of heat from the hot products of combustion in chimney 1 out into roof panel 11 which normally is made of combustible material.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the article and combinations herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a roof stack assembly adapted for use in upright position and having a chimney pipe, a spider mounted on the upper end of said chimney pipe, said spider having outwardly extending arms, a hood extending over the upper end of said chimney pipe, said hood being adjacent to and wider than the upper end of said chimney pipe but spaced above same and mounted on the arms of said spider so as to permit free fluid flow through said chimney pipe out from in under said hood and between said spider arms, the combination therewith of at least one outwardly extending louver on the outside of said chimney pipe, said louver on the outside of said chimney pipe, said louver passing completely around said chimney pipe with its lower edge substantially uniformly spaced from the latter, said louver being below said hood and opening downward, said chimney pipe having some perforations therethrough opening under said louver between the upper and lower edges of same for permitting limited air flow therethrough under cross wind and that flow passing in an upward direction into said chimney pipe on the windward side to promote upward fluid flow therethrough, wherein the outermost portion of said louver is in the form of a substantially cylindrical downturned flange which is substantially parallel to said chimney pipe and forms a baffle which reduces the choking effect of strong cross winds on draft in the chimney pipe.

2. In a roof stack assembly having a chimney pipe with a hood over the outlet end of same in position to permit gaseous fluid flow out through said chimney pipe and under said hood, at least one louver on the outside of said chimney pipe, said louver forming a tight fit at its inner portion on said chimney pipe and extending outward therefrom to a downturned flange which passes completely around said chimney pipe and substantially parallell thereto, and which downturned flange forms a baffle which reduces choking effect of strong cross winds on up draft in said chimney pipe, said louver being below said hood and opening downward, said chimney pipe having several perforations therethrough opening into the space under said louver between the upper and lower edges of same and constituting less than half of the uncovered surface area of said chimney pipe surface between the planes of the upper and lower edges of said louver to permit limited air flow therethrough under cross wind, and at least a portion of that flow passing in an upward direction, into said chimney pipe on the windward side to promote upward gaseous fluid flow therethrough.

3. In a roof stack assembly adapted for use in upright position and having a chimney pipe, a spider mounted on the upper end of said chimney pipe, said spider having outwardly extending arms, a hood extending over the upper end of said chimney pipe, said hood being adjacent to and wider than the upper end of said chimney pipe but spaced above same and mounted on the arms of said spider so as to permit free fluid flow through said chimney pipe out from in under said hood and between said spider arms, the combination therewith of at least one outwardly extending louver on the outside of said chimney pipe, said louver passing completely around said chimney pipe with its lower edge substantially uniformly spaced from the latter, said louver being below said hood and opening downward, said chimney pipe having some perforations therethrough opening under said louver between the upper and lower edges of same for permitting limited air flow therethrough under cross wind and that flow passing in an upward direction into said chimney pipe on the windward side to promote upward fluid flow therethrough, wherein the outer por-

tion of said louver is in the form of a substantially cylindrical downturned flange which is substantially parallel to said chimney pipe and forms a baffle which reduces the choking effect of strong cross winds on draft in the chimney pipe, and wherein said perforations in said chimney pipe, when same is in vertical position, are above the bottom edge of said louver and constitute less than half of the area of said chimney pipe surface under said louver and between the planes of its upper and lower edges.

4. In a roof stack assembly adapted for use in upright position and having a chimney pipe, a multiple armed spider mounted on the upper end of said chimney pipe with said arms extending sidewise from the upper end of said chimney pipe, an upwardly dished hood member of greater inside diameter than the upper end of said chimney pipe, said hood member having downturned sides with an outturned edge flange at the bottom of same, said outturned flange being engaged and held by the outer portion of the arms of said spider so as to permit free fluid flow through said chimney pipe and out from in under said hood between said spider arms, the combination therewith of multiple louvers on the outside of said chimney pipe, each of said louvers forming a tight fit at its inner portion on said chimney pipe and extending outward therefrom to a downturned flange which passes completely around said chimney pipe and substantially parallel to said chimney pipe and forms a baffle which reduces the choking effect of strong cross winds on draft in the chimney pipe, said downward opening louvers being below said hood, said chimney pipe having perforations therethrough under at least part of said louvers, said perforations being above the lower edge of said louvers and constituting less than half of the surface area of said chimney pipe surface under each louver and between the planes of its upper and lower edges to permit limited air flow therethrough under cross wind and that flow passing in an upward direction into said chimney pipe to promote upward fluid flow therethrough.

5. In a combined roof ventilator and roof stack adapted for use in upright position and having a chimney pipe, a spider means mounted on the upper end of said chimney pipe, said spider means having outwardly extending arms, a hood extending over the top of said chimney pipe, said hood being adjacent to and wider than the end of chimney pipe but spaced above same and carried by the arms of said spider so as to permit free fluid flow through said chimney pipe and out from in under said hood and between said spider arms, the combination therewith of at least one outwardly extending louver on the outside of said chimney pipe, said louver passing completely around said chimney pipe with its upper edge tightly fitting said chimney pipe and its lower edge substantially uniformly spaced from the latter, said louver being below said hood and opening downward, said chimney pipe having several perforations therethrough opening into the space under said louver between the upper and lower edges of same for permitting limited air flow therethrough under cross wind and that flow passing in an upward direction into said chimney pipe on the windward side of same to promote upward air flow therethrough, and a top flanged drainage louver mounted on said chimney pipe below said first named louver and having its upper portion tapering outward and downward from said top flange to an upright outer supporting edge member, a series of perforations in said tapering portion adjacent said outer supporting edge member of said drainage louver, said supporting edge member of said drainage louver having an outturned bottom flange which is depressed at intervals along its bottom to provide drainage openings under said flange between said depressed portions, and an annular passageway means extending around but spaced outward from said chimney pipe, said annular passageway means having an inlet at its bottom and an outlet at its top under said drainage louver, means for substantially preventing flow of any liquid into the upper end of said annular passageway means from said perforations of said drainage louvers, whereby a gaseous fluid such as air can flow through said annular passageway and carry away at least a portion of any heat radiated by said chimney pipe into said annular passageway.

6. In a combined roof ventilator and roof stack having a chimney pipe, a spider mounted on the upper end of said chimney pipe, said spider having a ring portion fitting said chimney pipe, said ring portion having outwardly extending arms, a hood extending over the top of said chimney pipe, said hood being adjacent to and wider than the end of said chimney pipe but spaced above same and carried by said spider so as to permit free fluid flow through said chimney pipe and out from in under said hood and between said spider arms, the combination therewith of at least one outwardly extending louver on the outside of said chimney pipe, said louver being below said hood and opening downward, said chimney pipe having several perforations therethrough opening under said louver between the upper and lower edges of same for permitting limited air flow therethrough under cross wind and that flow passing in an upward direction into said chimney pipe on the windward side of same to promote upward air flow therethrough, a top flanged drainage louver mounted on said chimney pipe below said first named louver and having its upper portion tapering outward and downward from said top flange to an upright outer supporting edge member, a series of perforations in said tapering portion adjacent said outer supporting edge member of said drainage louver, said supporting edge member of said drainage louver having an outturned bottom flange which is depressed at intervals to provide drainage openings under said flange between said depressed portions, an upper roof flange and a lower roof flange fitting said chimney pipe, said upper and lower roof flanges each having an offset portion adjacent said chimney pipe, said offset portions being offset away from said roof and being perforated, a tubular sleeve member extending down from said upper roof flange adjacent the outer edge of said offset portion and forming an air space around said chimney pipe, and a tubular sleeve member extending upward from said lower roof flange adjacent the outer edge of said offset portion and forming an air space around said chimney pipe, said upper sleeve member telescoping with said lower sleeve member to compensate for variations in thickness of a roof on which same can be mounted while providing an air passageway which opens into the space above said upper roof flange and under said flanged drainage louver, means for substantially preventing flow of any liquid into the upper end of said air space around said chimney pipe from said perforations in said drainage louver, whereby air is withdrawn from the space below said lower roof flange and used to carry away at least a portion of any heat radiated by said chimney pipe in the area between said upper and lower roof flanges.

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