

Sept. 18, 1956

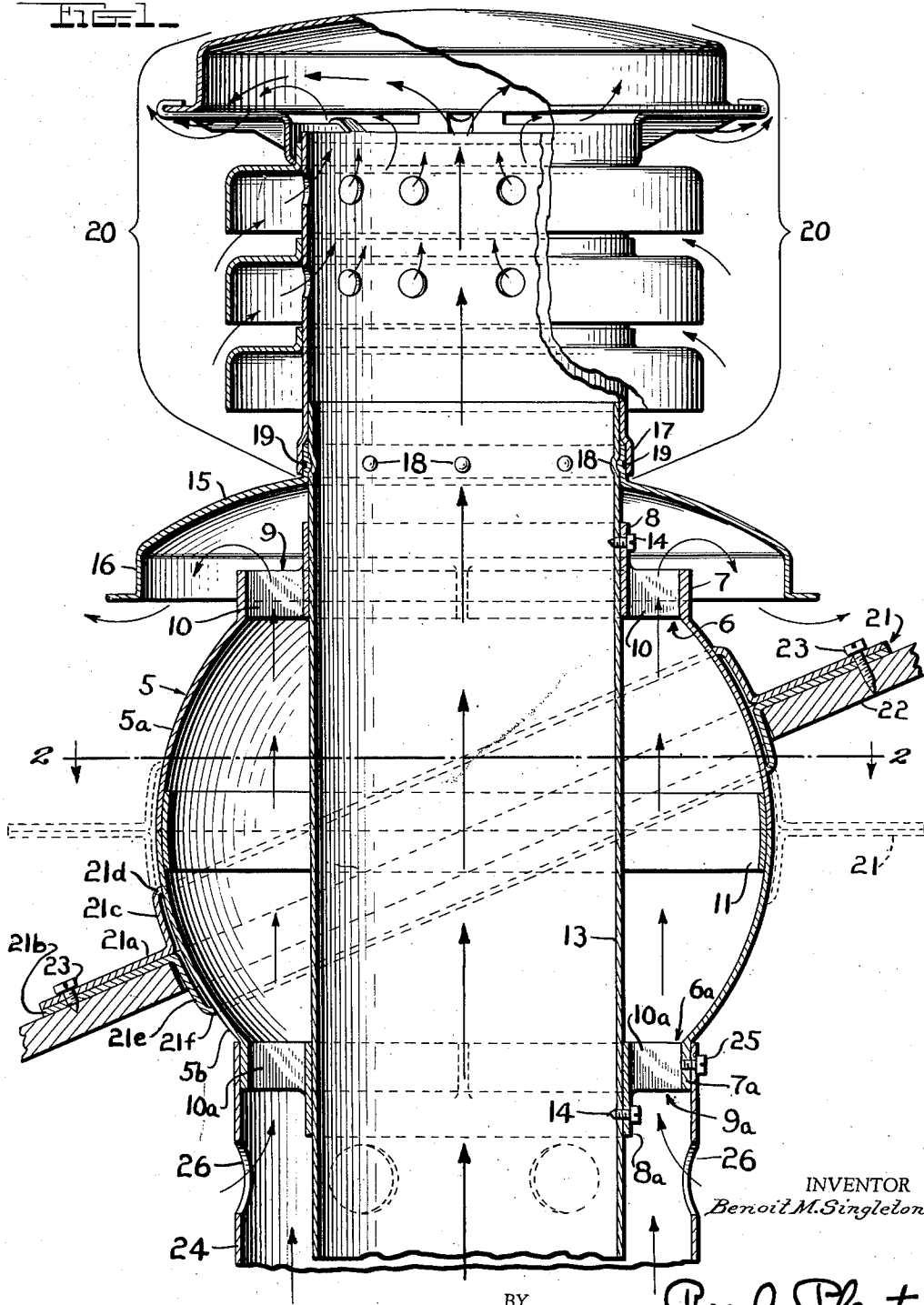
B. M. SINGLETON
UNIVERSAL ROOF STACK

2,763,196

Filed May 4, 1953

2 Sheets-Sheet 1

Fig. 1



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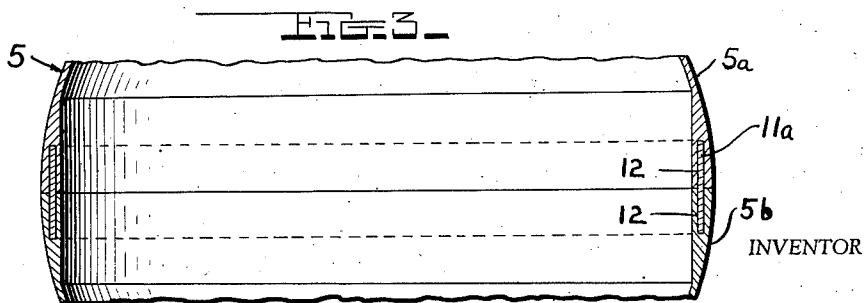
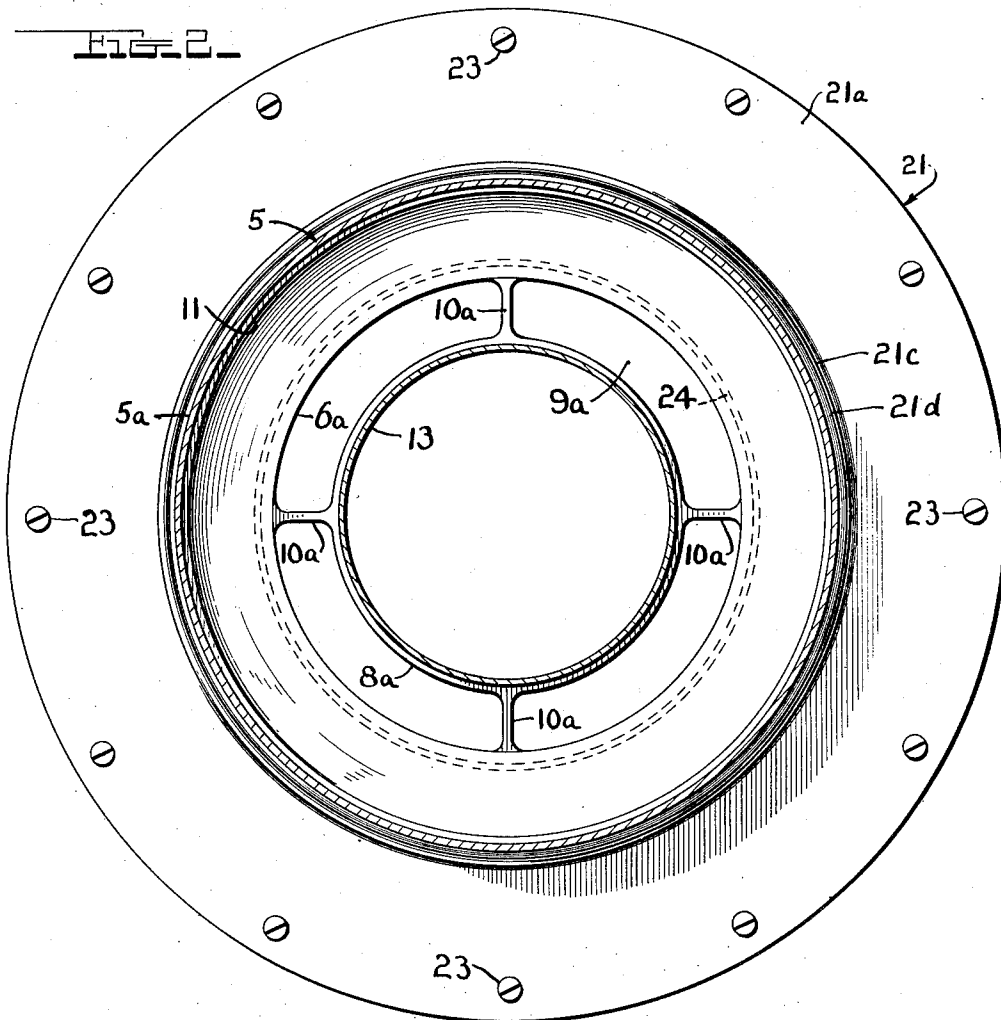
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1

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UNIVERSAL ROOF STACK

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13 Claims. (Cl. 98—46)

The present invention relates broadly to gaseous fluid discharge apparatus, and in its specific phases it relates more particularly to a roof stack adapted to be mounted on and adjustably fit roofs having different pitch angles while acting as a combined ventilator and chimney.

It is frequently necessary to extend the smoke pipe or stack from a heater or the like through ceilings, floors, sidewalls, and more commonly the roof of a building or a house trailer. As some roofs are substantially flat and others pitched at different degrees, it is highly desirable to provide a single construction for connecting the stack or smoke pipe with the roof regardless of moderate variations in the pitch or lack of pitch of the latter, and for flashing around said stack or smoke pipe in a weather-tight manner. Several proposals have been made for meeting some phases of this requirement but most of them have either not been adjustable at all, or have been only adjustable over a narrow pitch range not including flat roofs, and all of them have ignored the question of keeping the stack or smoke pipe sufficiently cool in the region of the roof to prevent a serious fire hazard so far as concerns roof stacks of adjustable construction adapting them to fit roofs varying from flat to a moderate pitch. It was a recognition of the shortcomings and limitations of such prior constructions 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 and improved construction which is readily usable on any roof regardless of moderate pitch or lack of pitch of same and provides for jacketing the stack or smoke pipe with cooling air immediately above and below the roof, as well as through same, to eliminate any fire hazard.

Another object of the present invention is to provide for continuous discharge of heated air from, and continuous admission of relatively cool air into the stack jacket to overcome all possibility of the cooling air in the jacket becoming so overheated as to be ineffective as a safeguard against fire.

Another object of the invention is to provide a moderate length jacket sleeve extending downward from the body of the stack jacket substantially concentric with the chimney so that hot products of combustion passing up the latter will induce, through radiated heat, a more rapid ventilating flow of cooling air through the stack jacket and out of the outlet above the roof line to drastically minimize any danger of overheating the roof panel.

A further object is to provide a novel construction which may be easily installed on a building or housetrailer without specially skilled workmen, yet will be highly effective and cannot become loose due to wind shaking or vibration due to the movement of the trailer over the road.

Yet another object is to provide a novel construction which may be easily and inexpensively manufactured and may therefore be profitably marketed at a reasonable price.

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

2

To the accomplishment of the foregoing and related ends, the invention, then, consists of the gaseous fluid discharge 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 several of various ways in which the principle of the invention may be used.

In the annexed drawings:

Figure 1 is a vertical sectional view showing the invention installed for passing a smoke pipe through a pitched roof and showing in dotted lines the only adjustment required for mounting it on a flat roof.

Figure 2 is a horizontal sectional view on line 2—2 of

Figure 1, looking in the direction of the arrows, but with the flange of Figure 1 adjusted to the dotted line position.

Figure 3 is a fragmentary vertical sectional view showing a slight modification.

Preferences in the stack construction have been disclosed in the drawings and will be rather specifically described, but it is to be understood that some variations may be made without departing from the spirit and scope of the invention as set forth. Also, while the invention will be described for its primary use, in connection with a smoke pipe extending through a roof, it is to be understood that it can be used to advantage with a pipe extending through a floor, ceiling, partition or side wall. The word "roof" is not therefore to be considered as limiting, nor are such relative terms as "upper" and "lower."

A body member having a spherical surface portion, hereinafter referred to as hollow ball 5, is provided with an opening 6 in its top and an opening 6a in its bottom, said openings being surrounded by cylindrical flanges 7 and 7a respectively, which are integral with said hollow ball 5. Within the confines of these flanges 7 and 7a and concentric with the latter, are two cylindrical collars 8 and 8a respectively, said collars being of much less diameter than said flanges to provide one space 9 between flange 7 and collar 8 and another space 9a between flange 7a and collar 8a. The flanges 7 and 7a are rigidly connected to the collars 8 and 8a by radial webs or spider arms 10 and 10a respectively.

The hollow ball 5 is preferably formed from an upper half 5a and a lower half 5b connected by a spherical surface splice ring 11 friction-fitted tightly into the contiguous portions of said halves, as shown in Figure 1. However, if desired, these contiguous portions may be thickened as shown in Figure 3 and provided with registering grooves 12 to frictionally receive a cylindrical splice ring 11a. Either construction provides a tight leak-proof joint between the two ball halves 5a and 5b. These halves, plus the flanges, webs and collars connected therewith form two identical units which may be readily die-cast in the same mould, or in large-scale production, in duplicate moulds, thus greatly lessening the expense for moulding equipment.

A smoke pipe section 13 extends through the collars 8 and 8a and diametrically through the hollow ball 5. This smoke pipe section 13 is secured to the collars 8 and 8a for instance with screws 14 which may be of the self-tapping type to cut their own screw threads through said smoke pipe section. This pipe section therefore further ties the two ball sections 5 and 5a tightly together and obviates any possible danger of the joint between said sections opening to any extent which would permit leakage.

The smoke pipe section 13 extends a short distance above the upper ball section 5a and carries a cowl flange 15, said cowl flange having a peripheral skirt 16 surrounding and outwardly spaced from the flange 7, thus permitting air to escape through the space 9 yet excluding rain, snow, etc. The cowl flange 15 is secured

3

to the smoke pipe section 13 in any suitable way. As shown, it is provided with a collar flange 17 surrounding the smoke pipe section 13, said collar flange and smoke pipe section being connected by forming them with inter-fitting deformed portions 18 and 19. The smoke pipe section 13 is engageable at its upper end with a smoke discharging and weather excluding hood 20 of conventional or other adequate construction.

A roof flange 21 snugly and weather-tightly surrounds the ball 5 and is readily adjustable to lie upon roof 22, whether the latter be flat or pitched at any moderate angle. This roof flange 21 is formed from two duplicate sections 21a and 21b secured together by threaded members 23, some or all of which may be in the form of screws which are long enough to also secure the flange to the roof. The upper flange section 21a has an up-standing flange 21c surrounding the ball 5, the free edge of said flange 21c being bent inwardly at 21d for weather-tight contact with said ball. The lower flange section 21b is provided with a corresponding but downwardly projecting flange 21e, the free edge of which is bent inwardly at 21f for tight contact with the ball 5. When assembling the roof flange 21 around the ball 5, the inwardly bent flange portions 21d and 21f contact with said ball when the flange sections 21a and 21b are about 1/4" apart. Therefore, when the screws 23 are tightened to draw the sections 21a and 21b together and secure the roof flange 21 to the roof, the aforesaid inwardly bent portions 21d and 21f are forced into continuous extremely tight contact with the ball 5, thus overcoming any danger of water entering between the roof flange and the ball, and at the same time holding the halves 5a and 5b of ball 5 from separating. To prevent any water from possibly entering between the roof flange 21 and the roof 22 either a gasket (not shown) or a plastic roofing cement (not shown) may be provided between said flange and roof.

Preferably a jacket sleeve 24 surrounds the smoke pipe section 13 below the ball 5 and is secured to the flange 7a by one or more screws 25. The lower end of this jacket sleeve 24 is open to the building or house trailer for air admission and air inlet openings 26 may also be formed in said jacket sleeve adjacent flange 7a for further increase in the rate of air flow. Thus, cooling air will enter the hollow ball 5 through the space 9a and will jacket the smoke pipe section 13 to keep the heat away from the roof 22, and as this air is heated it escapes through the space 9 and then out from in under the cowl flange 15. As long as the jacketing air is being heated by the smoke pipe section 13, there is a constant air flow through the ball 5 outside of smoke pipe section 13, keeping this ball at a safe temperature and thus obviating any fire hazard, even if said smoke pipe should become seriously overheated. However, for those purchasers in the category of "the burned child who really fears fire," an asbestos coating (not shown) may be sprayed onto the interior surface of the ball to further insulate same and retard heat flow to the roof panel 22.

For house trailers utilizing a heating stove with a 4" diameter smoke pipe 13, a convenient diameter of hollow ball 5 is 8", which permits the present assembly to fit all or substantially all roof pitches in common use. By increasing the diameter of this ball still steeper roof pitches can be accommodated while still further minimizing the fire hazard in view of the greater air space in the hollow ball.

From the above detailed description of the roof stack and the mounting of same, it is believed that its construction, use, and operation will at once be apparent, including the variations involved in the use of the alternate forms of the splice ring 11 or 11a. It is also to be noted that by making ball 5 of a larger diameter without increasing the diameter of smoke pipe 13, this will increase the maximum roof pitch to which the roof stack can be fitted with smoke pipe 13 remaining in vertical position.

4

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. A device of the class described usable as a stack for passage through a roof or the like, which comprises a hollow ball having an opening in its top and an opening in its bottom, a smoke pipe section open at all times for upflow of gases therethrough and extending through said hollow ball and said openings thereof and spaced inwardly from the perimeters of said openings to allow cooling air to enter said ball around said smoke pipe section through the lower opening and leave through the upper opening, centering means holding said smoke pipe section in substantially concentric relation with said ball and openings, means for anchoring said smoke pipe in fixed position in said hollow ball, and a roof flange snugly surrounding said ball and gripping same at opposite sides of a plane through the center of said ball, said flange being pivotally movable universally in angular relation with the axis of said smoke pipe section and adapted to support said hollow ball on a roof or the like.

2. A structure as specified in claim 1; said smoke pipe section extending above said ball, and a cowl flange carried by said smoke pipe section and disposed over said upper opening so as to cover and exclude water therefrom under rain storm conditions.

3. A structure as specified in claim 1; said centering means comprising collars surrounding said smoke pipe section and spider arms extending from said collars to said ball so as to leave an open passageway for a cooling fluid to flow through said ball outside of said smoke pipe section.

4. A structure as specified in claim 1; said roof flange including means for adjustably fitting same to said hollow ball.

5. A structure as specified in claim 1; wherein the roof flange snugly surrounding said hollow ball has means for varying its grip on said hollow ball to facilitate adjustably fitting same from a position perpendicular to the axis of said smoke pipe to one at a moderate angle therefrom, said roof flange comprising an upper open circular section having an upstanding flange surrounding said ball, and a lower open circular flange section having a downwardly projecting flange surrounding said ball, the free edges of said upper and lower flanges being turned inwardly into tight contact with said ball, and means for securing said sections together.

6. A structure as specified in claim 1; said centering means comprising collars surrounding said smoke pipe section and spider arms extending from said collars to said ball, said ball having cylindrical flanges surrounding said openings and secured to the outer ends of said spider arms.

7. A structure as specified in claim 1; said smoke pipe section extending above said ball, a cowl flange carried by said smoke pipe section and disposed over said upper opening to exclude water therefrom, said centering means comprising collars surrounding said smoke pipe section and spider arms extending from said collars to said ball, said ball having cylindrical flanges surrounding said openings and secured to the outer ends of said spider arms, said cowl flange having a depending peripheral skirt spaced outwardly from the uppermost of said cylindrical flanges.

8. A structure as specified in claim 1; said hollow ball comprising an upper half and a lower half abutting each other, and a splice ring engaging the abutting portions of said ball halves for holding them in alinement and preventing water entrance between them.

5

9. A structure as specified in claim 1; said hollow ball comprising an upper half and a lower half abutting each other, a splice ring engaging the abutting portions of said ball halves and making same substantially water tight, and said roof flange having upper and lower circular members with a similar portion of each smaller than said ball and adapted to grip same, threaded means for varying the grip of said roof flange on said ball to facilitate adjustment of said roof flange on said ball and anchoring same together in adjusted position.

10. A structure as specified in claim 1; said hollow ball comprising an upper half and a lower half abutting each other, and a splice ring engaging the abutting portions of said ball halves for holding them in alinement and preventing water entrance between them, said abutting portions of said ball having continuous grooves tightly receiving said splice ring.

11. A structure as specified in claim 1; said centering means comprising collars surrounding said smoke pipe section and spider arms extending from said collars to said ball, said ball having cylindrical flanges surrounding said openings and secured to the outer ends of said spider arms, and a cool air conducting sleeve surrounding said smoke pipe section below said ball, said sleeve engaging the lowermost of said cylindrical flanges.

12. In a device of the class described adapted to pass through a roof or the like and having a ball for reception in a roof opening; a smoke pipe section extending all the way through said ball and open at all times for flow of gases therethrough, said ball having openings alongside of said smoke pipe section for flow of cooling

6

air through said ball in the space around said smoke pipe; a roof flange surrounding said ball, said roof flange comprising an upper circular section having an upstanding flange surrounding said ball, and a lower circular section having a downwardly projecting flange surrounding said ball, the free edges of said upper and lower flanges being turned inwardly into tight contact with said ball, and means for adjustably securing said sections together to facilitate adjustment of said roof flange and the anchoring of same to said ball in adjusted position.

13. A structure as specified in claim 12; wherein there is a hood means over the upper air openings from said ball alongside said smoke pipe section, and said securing means includes threaded means extending downwardly through said sections for tightly gripping same to said ball in various angular positions and also securing said roof flange to a roof.

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