May 23, 1961 R. L. HATCHER 2,985,091

CAP ASSEMBLY

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FIG_1

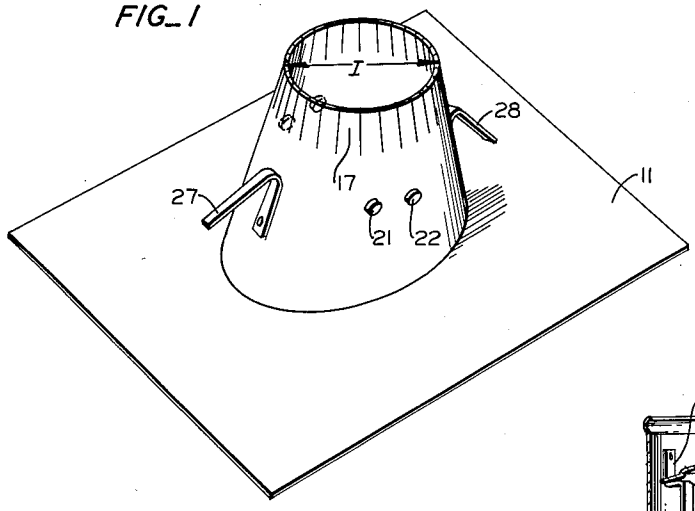


FIG_2

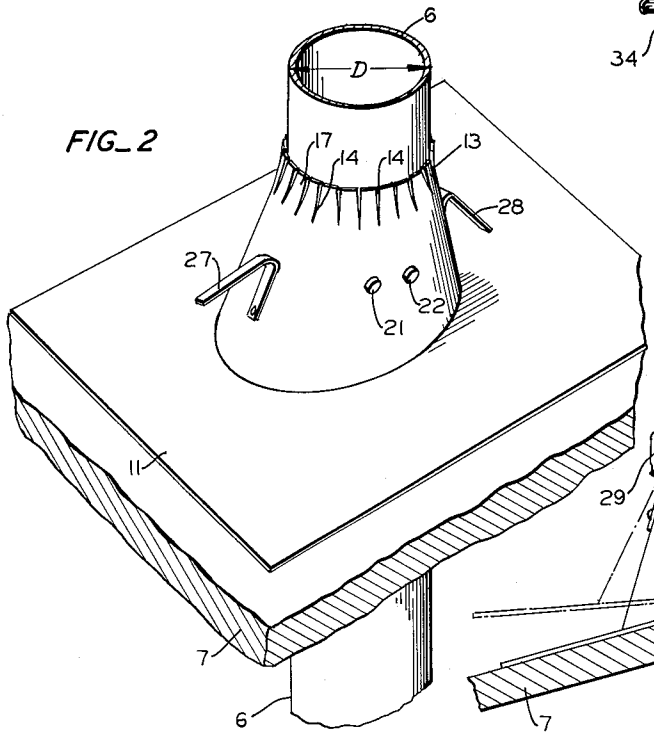
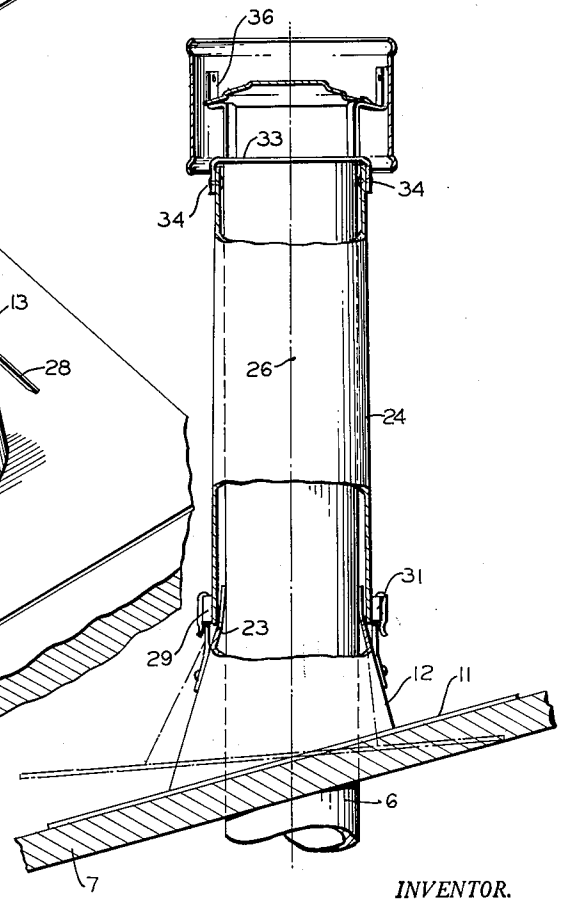


FIG_3



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CAP ASSEMBLY

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FIG_4

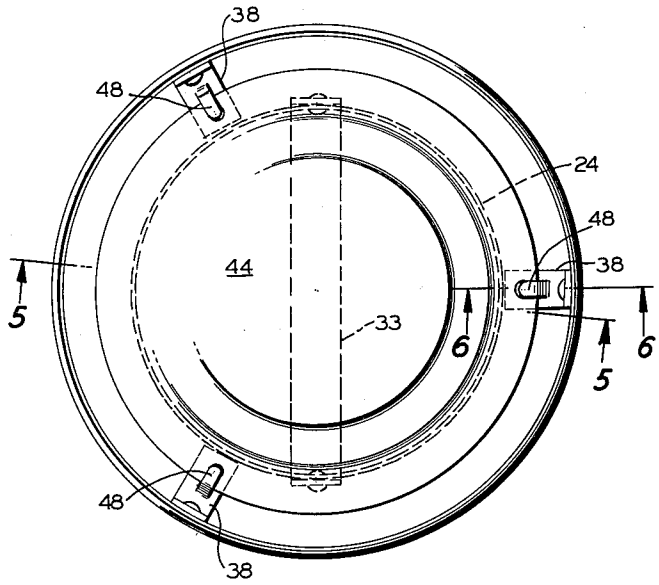
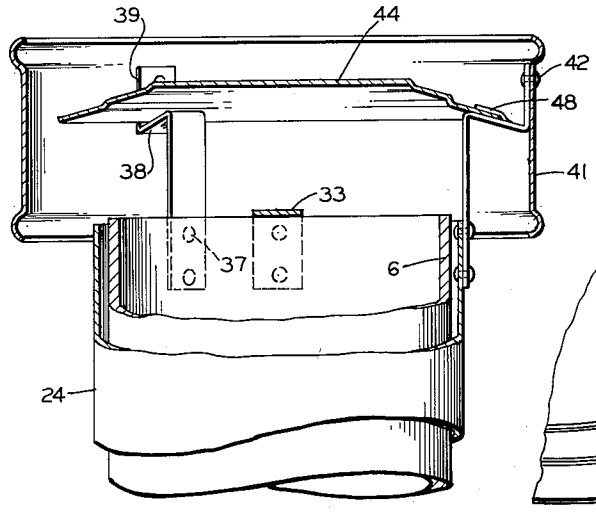


FIG_5



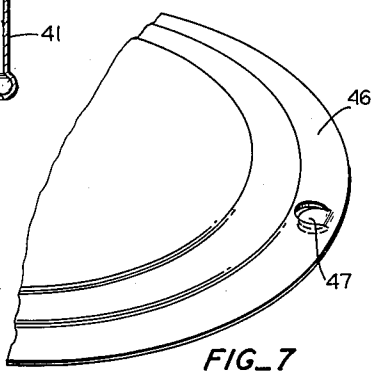


FIG_7

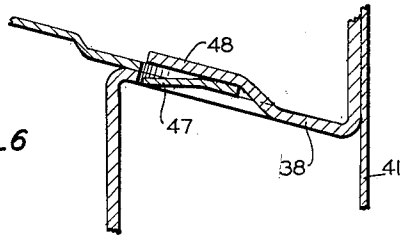


FIG_6

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2,985,091

CAP ASSEMBLY

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Filed June 12, 1958, Ser. No. 741,653

8 Claims. (Cl. 98—46)

My invention relates to means useful in connection with building roofs through which vent pipes project. The device is for sealing the joint between the roof and the vent pipe and for providing a suitable terminus for the vent pipe in order to protect the building against the incursion of the elements as well as to provide a suitable vent outlet. This is accomplished for different size vent pipes and for roofs of different pitch.

A device of this general character is shown in my copending application entitled "Roof Ventilator," Serial Number 106,928; filed September 20, 1956, now Patent 2,909,113, issued October 20, 1959, and assigned to the assignee of the present application.

An object of the invention is to provide a cap assembly affording improved and thorough protection against the elements.

Another object of the invention is to provide a cap assembly of adjustable nature for use with roofs of various pitches.

Another object of the invention is to provide a cap assembly useful with various pipes of varying diameters.

Another object of the invention is to provide a cap assembly that is easy, simple and economical to manufacture and to use.

A still further object of the invention is to provide a cap assembly which can readily be fabricated and assembled from simple components.

Another object of the invention is to provide a cap assembly generally improved over those heretofore known.

Other objects, together with the foregoing, are attained in the embodiments of the invention described in the accompanying description and illustrated in the accompanying drawings in which:

Figure 1 is a perspective of an anchor plate and cowl portion of my cap assembly.

Figure 2 is a view comparable to Figure 1 but showing the unit installed on a roof and around a vent pipe.

Figure 3 is for the most part a cross section on a vertical axial plane showing a cap assembly mounted on a roof and around a vent pipe in a typical installation.

Figure 4 is a plan of the cap assembly, the anchor plate and cowl being omitted.

Figure 5 is a cross section the plane of which is indicated by the line 5—5 of Figure 4.

Figure 6 is a cross section in detail to an enlarged scale the plane of section being indicated by the line 6—6 of Figure 4.

Figure 7 is an isometric view of a portion of a deflecting plate that is part of the cap assembly.

The cap assembly of my invention is especially designed for use with a vent pipe projecting through a slanting roof and is adaptable for use in a number of different environments. As an example, it has been commercially successful in the form illustrated herein. In this example, the installation is made in connection with a circular cylindrical vent pipe **6** having a nominal outer diameter D (Figure 2). This diameter is held with some

exactness in some kinds of vent pipes, but varies in others. For example, metal vent pipes are usually fairly close to a nominal, finished diameter, although they vary somewhat. Vent pipes of asbestos composition although perhaps of the same nominal diameter vary considerably in actual diameter. Furthermore, vent pipes are not always precisely circular in cross section, but rather are somewhat variable in shape as well as size. The illustrative vent pipe **6** projects through and extends above a roof **7** shown diagrammatically and usually covered with some sort of superficial roofing material, not shown.

Pursuant to this invention there is provided a generally rectangular, planar anchor plate **11** preferably fabricated of sheet metal and designed to lie flat on the top of and against the roof **7**. The anchor plate **11** has a central opening around the edge of which is fastened a frusto-conical cowl **12**. This is also fabricated of relatively light, somewhat flexible and deformable sheet metal. The cowl **12** forms a leakproof joint with the anchor plate **11**. Especially in accordance with this invention, the cowl **12** terminates at its upper edge in a deformable margin **13**. This can be provided in a number of different ways, but preferably and in the present instance is formed by a plurality of slits **14** substantially along the elements of the cowl cone. The slits extend downwardly from the upper margin of the cowl. As initially formed and before deformation or use, the inner diameter I of the upper margin **13** of the cowl is somewhat less than the outer diameter D of the vent pipe.

In use, the anchor plate and cowl assembly are forced downwardly over the upper end **16** of the vent pipe. This operation is effective to bend and spread the outer portions of the individual fingers **17** forming the deformable margin and to deflect them so that they lie very closely against the body of the vent pipe no matter what actual diameter or what the actual contour of the pipe may be.

The anchor plate and the deformed cowl margin in and of themselves form a very nearly weather tight protection between the roof **7** and the upper portion of the vent pipe. Thus, the deformable cowl margin constitutes a sort of primary weather seal. Furthermore, this primary seal is effective because the cowl margin is individually formed as it is installed in accordance with the particular slope of the individual installation and in accordance with the particular size and positioning and shape of the individual vent pipe. A quite flexible, universally applicable mechanism is thus provided.

Even though the vent pipe **6** is of metal, a relatively good conductor of heat, the temperature of the roof pipe is not transmitted well to the cowl or the anchor plate because the fingers **17** themselves only have light frictional contact with the pipe and, because of the slits **14**, serve as good radiators. The temperature of the cowl itself never rises to an unacceptable value.

Pursuant to the invention, further protection against the elements and further sealing is provided. The cowl on its opposite sides is provided with pairs of projecting button rivets **21** and **22** on which rests the lower edge **23** of a connecting pipe **24**. This surrounds and protects the vent pipe. Since the cowl is somewhat flexible, as is the connecting pipe **24**, the connecting pipe can be disposed with its axis exactly coincident with the axis **26** of the vent pipe. This always occurs despite the different angularity of different roofs, for the flexibility of the overlapped parts allows variation in their theoretical cross sectional geometry so that they deflect each other into a common cross section and a substantially tight joint is thus made.

The vent pipe is secured in its appropriate position by deformable straps **27** and **28** which pass through loops

29 and 31 on the connecting pipe and are bent over and serve as holding means. The lower end of the connecting pipe 24 overlies and surrounds the deformable margin 13 and in any installed position extends below any of the slits 14 so that there is a tight closure against entry of the elements, although there can be small internal flow through the slits 14.

Partly to bear the weight of the connecting pipe 24 and partly to insure that the vent pipe 6 does not extend to an inordinate degree, the top of the connecting pipe is provided with a diametrical stop strap 33 having its ends bend over and secured by rivets 34 to the connecting pipe. In this way the flue pipe or vent pipe cannot project inordinately and some of the weight of the connecting pipe is borne by the stop strap as well as on the rivets 21 and 22. Additional stability in the positioning and mounting of the connecting pipe is thus afforded.

As a further protection against the elements, the upper portion of the connecting pipe is provided with brackets 36 in any convenient number; for example, three. These are secured by rivets 37 to the upper portion of the connecting pipe and extend thereabove a selected distance, being suitably bent outwardly as at 38, finally terminating in tabs 39. A deflector or baffle 41 preferably comprised of a circular band of sheet metal appropriately ridged for stiffness is secured by rivets 42 to the brackets 36. The deflector is held in a position spaced away from the upper end of the connecting tube, depending slightly below the upper end thereof, and extending thereabove in order to direct gas issuing from the vent tube and to deflect ambient air currents appropriately.

Also supported on the brackets 36 within the baffle 41 is a deflecting plate 44. This is fabricated of sheet material appropriately shaped and embossed and is of a diameter considerably greater than that of the connecting pipe 24 and even greater than the diameter of the deformable margin 13. The deflecting plate 44 overlies and so acts as a vertical protection against rain falling directly downwardly. This is kept from entering the connecting tube or the flue pipe.

In order readily to secure the deflecting plate in position, around its margin 46 it is provided with a number; for example, three, of partially severed and partially indented tabs 47 at appropriate locations. These tabs are struck downwardly so that they are somewhat springy and can be forced under and interlocked with upstanding lugs 48 partially struck and displaced from the offset portion 38 of the brackets 36. With this interengagement, the deflecting plate 44 is easily snapped into position on the supporting brackets and is firmly held against displacement in any direction.

By the provision of this mechanism there is afforded an assembly of separate portions which can easily be fabricated and shipped, yet which can at the site readily be installed at substantially any angle on a vent pipe of nearly any commercial size and despite irregular pipe contour. The roof plate and cowl portion forms a suitable primary closure with the vent pipe yet the contact and arrangement is such that no substantial transfer of heat takes place. The remaining part of the cap assembly serves as a secondary protection or shield against the elements and to deflect gas issuing from the vent pipe and to direct the adjacent air flow.

What is claimed is:

1. A cap assembly for use with a vent pipe projecting through a roof comprising an anchor plate, a frusto-conical cowl upstanding from said anchor plate, means defining deformable fingers at their bottoms only joined to the upper margin of said cowl in position to be bent upwardly and outwardly by said vent pipe when said cowl is forced downwardly thereover, and a connecting tube substantially coaxial with and surrounding said pipe and engaging said cowl in a location away from said fingers.

2. A cap assembly for use with a vent pipe of a selected diameter comprising a cowl of deformable material constituting a frustum of a cone, a first right section of said frustum at one end being a first circle of less than said selected diameter, one portion of said cowl having slits therein extending along elements of said cone to said one end and to a second right section of said frustum that is a second circle of more than said selected diameter, means for supporting said cowl on a roof, a tube of greater diameter than said second circle, and means for holding said tube in a position surrounding said slits and against said cowl.

3. A cap assembly for use with a vent pipe comprising an anchor plate having an opening therein through which said vent pipe is adapted to pass, a frusto-conical cowl upstanding from said anchor plate, a tube adapted to be disposed substantially coaxially with and surrounding said vent pipe, means for holding said tube in abutment with said cowl, and deformable fingers extending freely from said cowl into position for frictional engagement with said vent pipe and within said tube.

4. A cap assembly for use with a vent pipe projecting upwardly through a roof comprising an anchor plate having an opening therein to pass said vent pipe, a frusto-conical cowl upstanding from said anchor plate in a position to encompass said vent pipe, the bottom of said cowl joining said anchor plate around the edge of said opening and the top of said cowl terminating in an upwardly bendable margin originally smaller than said vent pipe but being expandable by the insertion of said vent pipe therethrough to engage said vent pipe frictionally, a connecting tube greater in diameter than said vent pipe and adapted to surround said vent pipe with the bottom of said tube resting upon said cowl in a location lower than said bendable margin of said cowl, means forming a stop on said tube spanning said tube above and resting on the top of said vent pipe, a deflecting plate larger in diameter than said tube, and means for supporting said deflecting plate overlying and spaced above the upper end of said tube and overlying said bendable margin of said cowl.

5. A cap assembly for use with a vent pipe projecting upwardly through a roof comprising an anchor plate having an opening therein to pass said vent pipe, a frusto-conical cowl upstanding from said anchor plate in a position to encompass said vent pipe, the bottom of said cowl joining said anchor plate around the edge of said opening and the top of said cowl terminating in a margin having a plurality of slits extending downwardly from the upper edge thereof to form bendable fingers, said upper edge originally defining an upper opening smaller than said vent pipe but said bendable fingers being deformable upwardly by the insertion of said vent pipe through said upper opening to afford an upper opening substantially of the size of said vent pipe, a connecting tube larger in diameter than said vent pipe and adapted to surround said vent pipe with the bottom of said vent pipe resting upon said cowl in a location lower than said fingers, and means for holding said connecting tube in engagement with said cowl.

6. A cap assembly for use with a vent pipe projecting through a roof comprising a planar anchor plate having a central hole, an upwardly diminishing frusto-conical cowl upstanding from said anchor plate around the edge of said hole, upwardly deformable fingers upstanding from the upper edge of said cowl and disposed to be deflected upwardly to rest in frictional engagement with said vent pipe when said vent pipe extends through said anchor plate to a point above said cowl, a connecting tube disposed to be substantially coaxial with and to surround said pipe and at the bottom to engage said cowl below said fingers, and means for holding said connecting tube and said cowl in engagement.

7. A cap assembly for use with a vent pipe projecting upwardly through a roof comprising supporting means adapted to abut said roof and encompass said vent pipe,

said means including a plurality of upwardly and inwardly extending radially separate fingers of deformable material, said fingers when undeformed being contiguous and defining at their lower ends a figure of greater diameter than that of said vent pipe and defining at their upper upper edges a figure of lesser diameter than that of said vent pipe, a connecting tube adapted to encompass said vent pipe and to engage said supporting means outside of and below said fingers, and means for holding said connecting tube and said supporting means in engagement.

8. In a cap assembly for use with a vent pipe projecting through a roof, an anchor plate having an opening therein of greater diameter than said pipe, and a frusto-conical cowl upstanding from said anchor plate around said opening and having a plurality of slits extending downwardly along conical elements from the upper margin of said cowl and terminating in a lower location to define

a plurality of deformable fingers engageable with said vent pipe, the perimeter of said upper margin when said fingers are undeformed being less than the perimeter of said pipe and the perimeter of said fingers at said lower location being more than the perimeter of said pipe.

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