June 16, 1959 A. L. FERNSTEN ET AL 2,890,642

CAP ASSEMBLY

Filed Aug. 12, 1957

FIG_1

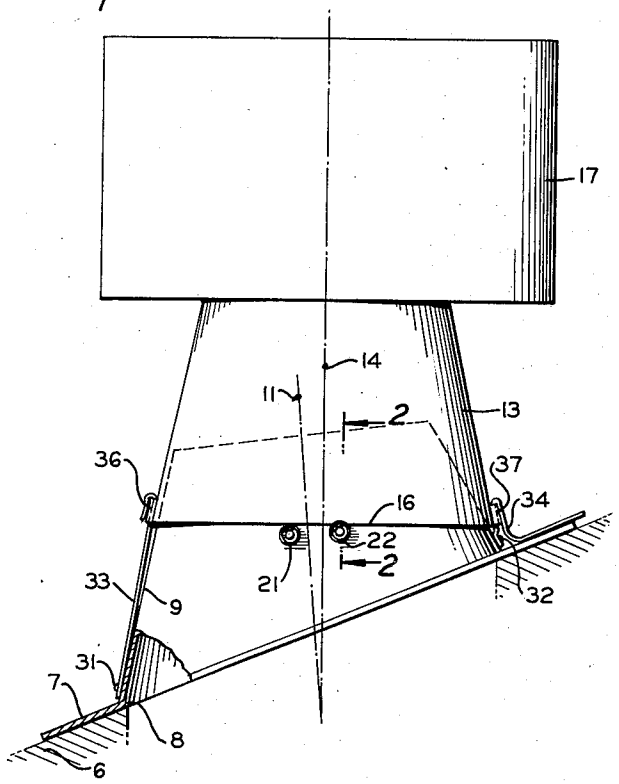
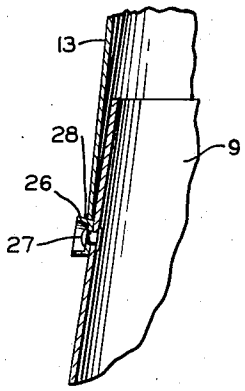


FIG_2



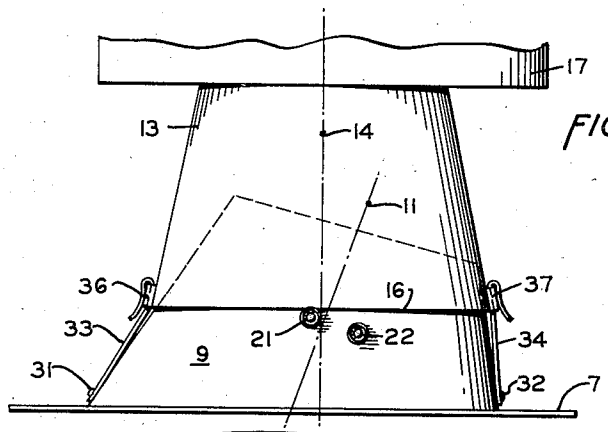


FIG_3

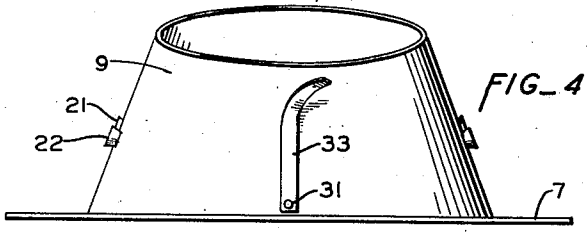


FIG_4

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CAP ASSEMBLY

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4 Claims. (Cl. 98—46)

Our invention relates to the building construction field and is concerned particularly with a mechanism for fitting near or over a vent pipe to continue the vent pipe above the building roof, the mechanism being effective as an extension of the vent pipe and as a flashing. It is desirable to provide such a structure to accommodate itself to roofs of varying pitch. A structure of a similar nature and for similar purposes is shown in the co-pending application of Robert L. Hatcher, entitled Roof Ventilator, Serial No. 610,928, filed September 20, 1956. Devices of this sort are usually constructed of sheet metal of geometrical configuration. They are arranged so as to be set or adjusted to accommodate themselves to roofs of varying inclination or pitch. Since usually the geometrical configurations have a circular cross-section arranging them at different pitches involves the production of elliptical sections. There is thus a tendency for the adjustable portions of the structure to fit poorly or to permit egress of gases or ingress of water or wind.

It is therefore an object of our invention to provide a cap assembly made of customarily recognized geometrical shapes but in which the movable parts are related to each other in such fashion that they fit with commercial tightness in any of the adjusted positions.

Another object of the invention is to provide a cap assembly which can readily be shifted from one adjusted position to another in a path such that the parts are at all times in relatively good contact with each other.

A still further object of the invention is to provide a cap assembly in which the upper part transmits its weight to the lower one in a fashion which does not cause sticking or jamming or undue distortion of the parts.

Another object of the invention is in general to provide an improved cap assembly.

While the cap assembly pursuant to the invention can be incorporated in a large number of different ways, it has successfully been fabricated on a commercial scale as described in the accompanying description and especially as shown in the accompanying drawings in which:

Figure 1 is a side elevation of a cap assembly constructed in accordance with the invention, the assembly being shown on a roof having a predetermined pitch.

Figure 2 is a cross-section of a fragment of the structure to an enlarged scale, the plane of the section being indicated by the line 2—2 of Figure 1.

Figure 3 is a side elevation somewhat similar to Figure 1 but showing the parts assembled in a different angular relationship.

Figure 4 is an end elevation of the base plate and duct mechanism by itself.

In the customary environment, the cap assembly is installed on a roof 6 having any one of a number of random pitches ranging all the way from flat to quite steep. The cap assembly itself includes a planar base plate 7 preferably fabricated of sheet metal such as galvanized sheet iron having a rectangular plan. The plate 7 is provided with a central aperture 8 which is exactly or approximately circular to afford room to pass a vent pipe (not shown) therethrough. The base plate 7 is secured to the roof 6 in any suitable fashion and is generally covered partly or entirely with roofing or is treated in any of the standard ways.

Upstanding from the base plate 7 and at its lower margin secured thereto around the periphery of the opening 8 is a duct 9, also fabricated of galvanized sheet metal or the like. The duct 9 is preferably frusto-conical in configuration, the axis 11 of the cone being almost perpendicular to the plane of the plate 7. A normal cross-section of the frusto-conical duct 9 is a circle. A closed cross-section of the duct not normal to the axis is an ellipse. Hyperbolic cross-sections are not of interest herein. The upper portion of the duct 9 is open so that the duct serves as a conduit or channel for the passage either of gas or of a through pipe (not shown).

Designed to co-operate with the duct is a sleeve 13, likewise preferably fabricated of galvanized sheet metal, having a frusto-conical configuration approximately that of a right cone about a central axis 14. The sleeve 13 is open at its bottom, the bottom, marginal edge 16 being defined by an intersecting plane normal to the axis 14. The upper portion of the sleeve 13 is open and leads into a ventilating terminal 17 of any customary sort, preferably of the sort shown in the above-identified application.

In installed relationship, the sleeve 13 telescopes over the duct 9 and since the sleeve 13 is bound at its lower edge by a margin which is in a plane normal or perpendicular to the axis 14, the shape of the lower edge 16 is substantially a circle. When the sleeve 13 is telescoped with the duct 9 and also when the relationship of the two movable parts is such that the axes 11 and 14 coincide, then the circular section of the lower edge of the sleeve 13 fits exactly on a circular section of the duct 9. In other intersecting positions of the axes, the sleeve must accommodate itself to an elliptical cross-section of the duct. This can be done with commercial (although not mathematical) exactness partly due to the slight flexibility of the sheet metal parts.

The weight of the sleeve 13 and its attached parts and downward forces thereon are not transferred through the entire periphery of the edge 16. Distortion due to such forces is avoided and a commercially tight fit in all adjusted positions is provided by special means.

Pursuant to the invention, the duct on opposite ends of an approximate diameter is provided with a plurality of pairs of projections 21 and 22. The pair of projections as seen in Figure 1, for example, extends from one side of the duct 9 half way between its longest element and its shortest element. The centers of the projections 21 and 22 are on an imaginary line which approximately intersects the plane of the base plate 7 adjacent the side thereof near the short element. The projections at the opposite end of the diameter of the duct 9 are substantially the same as those illustrated in Figure 1.

As particularly shown in Figure 2, each of the projections preferably includes a small stamped cup 26 secured in position by a rivet 27 passing through the wall of the duct 9. The cup 26 is slightly conical so as to form an inwardly directed groove 28 for the reception of the immediately adjacent lower edge 16 of the sleeve 13.

With this arrangement, the weight of the sleeve 13 and of the superposed member 17 and the effect of downward forces thereon are borne primarily by the portion of the lower marginal edge 16 which rests upon the immediately subjacent one of the projections such as 22, as shown in Figure 1. In use, the sleeve 13 can be rocked laterally about the projections 22 as a fulcrum into a new position in which the edge 16 connects also or abuts with the pair of projections 21. Continued rocking movement causes the edge 16 to leave the pair of projec-

tions 22 and eventually to achieve a location as illustrated in Figure 3.

It has been found in practice that by the provision of the pairs of fulcrums at opposite sides as distinguished from single fulcrums, the upper sleeve in rocking laterally does so about a plurality of points so that it coincides, with commercial accuracy, with the adjacent cross-section of the duct. The projections act as stops or supports so that the weight of or downward forces on the upper portions of the structure do not cause excess deformation of the relatively thin metal of which the duct and sleeve are made. As a result of the provision of the plurality of pairs of fulcrum projections, the upper sleeve rocks easily upon the lower duct into any one of numerous adjusted positions with the axes 11 and 14 in coincidence or diverging from each other in either of the opposite directions.

Means are provided for holding the sleeve and its appurtenances and the duct in any adjusted position. Secured to the duct by rivets 31 and 32 are bendable straps 33 and 34. These can be passed through upstruck lugs 36 and 37 outstanding from the lower portion of the sleeve 13. The straps are preferably passed through the lugs 36 and 37 and after the sleeve and the duct have been brought into the desired relative position, the two straps 33 and 34 are bent over as shown in Figure 1. This secures the various parts together in a fixed adjusted relationship with the weight of the superimposed parts being borne largely by the projections such as the pair 21 or the pair 22 and with the lower marginal edge 16 of the sleeve in very close, approximate contact with the subjacent surface of the duct. A commercially tight structure is provided for any rocked or adjusted position of the mechanism.

What is claimed is:

1. A cap assembly comprising a planar base plate, a duct in the shape of a truncated cone upstanding from said base plate, the axis of said duct being inclined with respect to the plane of said base plate, a sleeve in the shape of a truncated cone adapted to telescope over said duct and to be rocked laterally on said duct with the axis of said sleeve swinging to either side of a position in coincidence with the axis of said duct, said sleeve having a lower edge, a plurality of projections projecting outwardly from each side of said duct and positioned to be successively engaged by the adjacent edge of said sleeve in successive rocked positions thereof, and means for holding said duct and said sleeve in a selected rocked position.

2. A cap assembly comprising a planar base plate, a duct in the shape of a truncated cone upstanding from said base plate, a plurality of pairs of projections outstanding from said duct, each pair of said projections being at one end of a diameter of said cone, and said projections of said pairs being centered in a plane converging toward the plane of said base plate, a sleeve adapted to telescope said duct and to rest successively on either corresponding ones of said projections in said pairs, and means for adjustably holding said duct and sleeve in telescoped relationship.

3. A cap assembly comprising a planar base plate having an aperture therein, an upstanding frusto-conical duct secured to said base plate in registry with said aperture, said duct being disposed with its axis inclined to the plane of said base plate to establish two lateral conical elements circumferentially equidistant from the longest and the shortest elements of said inclined duct, a frusto-conical sleeve adapted to telescope over said duct, said sleeve having a lower boundary edge lying in a plane substantially normal to the conical axis of said sleeve, two pairs of projections mounted on and outstanding from said duct, the projections of one of said pairs being disposed on opposite sides of but close to one of said lateral conical elements and the projections of the other of said pairs being disposed on opposite sides of but close to the other of said lateral conical elements, all of said projections being centered substantially in a plane normal to the axis of said conical duct and to contact said lower boundary edge in one position of said sleeve relative to said duct, and means adjacent said longest and shortest elements for holding said sleeve in position relative to said duct and with said lower boundary edge in contact with one or both of said projections of each of said pairs.

4. A cap assembly comprising a planar base plate having an aperture therein, an upstanding frusto-conical duct of flexible sheet metal secured to said base plate in registry with said aperture, said duct being disposed with its axis inclined to the plane of said base plate to establish lateral conical elements circumferentially equidistant from the longest and the shortest elements of said inclined duct, a frusto-conical sleeve of flexible sheet metal adapted to telescope over said duct, said sleeve having a lower boundary edge lying in a plane substantially normal to the conical axis of said sleeve, said boundary edge substantially abutting and being slightly deformed by said duct, two pairs of projectings mounted on and outstanding from said duct, the projections of one of said pairs being disposed on opposite sides of but close to one of said lateral conical elements and the projections of the other of said pairs being disposed on opposite sides of but close to the other of said lateral conical elements, all of said projections being centered substantially in a plane normal to the axis of said conical duct and to contact said lower boundary edge in one position of said sleeve relative to said duct, and means on said duct and said sleeve circumferentially between said lateral conical elements for holding said sleeve in position on said duct and with said lower boundary edge in contact with one or both of said projections of each of said pairs.

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