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COWLING DEVICE FOR UNDERGROUND VENT STACK

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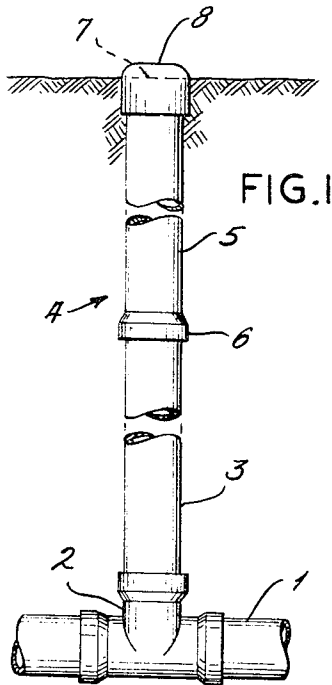


FIG. 1

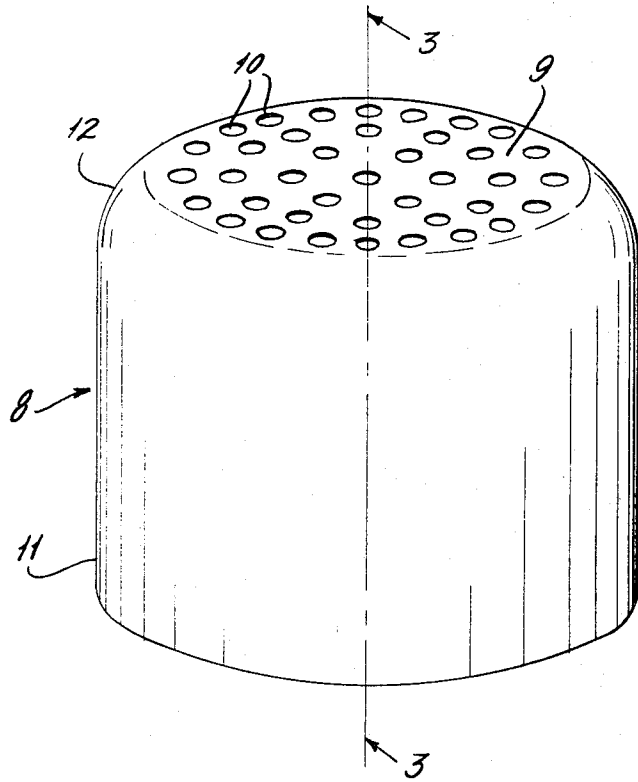


FIG. 2

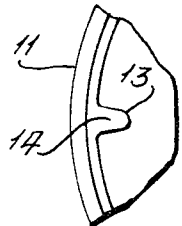


FIG. 4

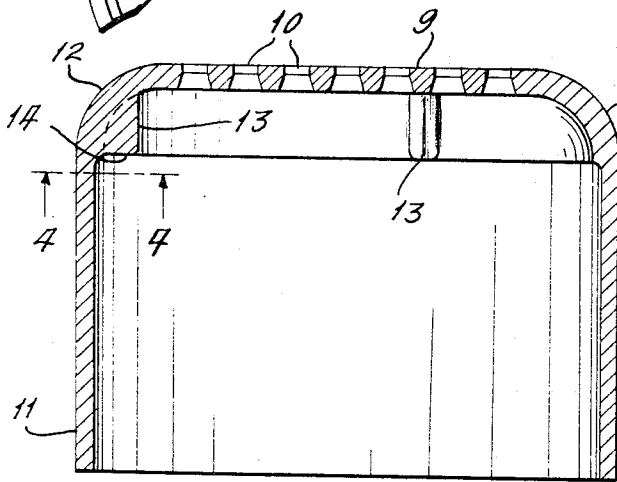


FIG. 3

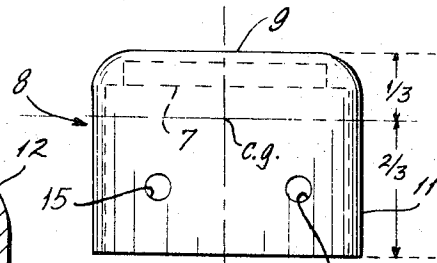


FIG. 5

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**COWLING DEVICE FOR UNDERGROUND
VENT STACK**

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ABSTRACT OF THE DISCLOSURE

An assembly encasing and protecting the upper end of the vent stack extending upwardly from an underground conduit line. An inverted cup-shaped hood which includes a plate member overlies the upper end of the stack substantially flush with the ground and a skirt portion depends from the perimeter of the plate member which externally surrounds the stack. The soil engages the exterior of the skirt portion and serves to maintain the hood in position over the stack.

This invention relates in general to a covering structure, and more particularly, pertains to a cowling device for covering the end of a conduit.

Various forms of conduits assembled from piping, tubing, or of ceramic tile construction have long been utilized for providing a means for conveyance of flowable material, and in particular, function as waste lines for sewage and other flowable liquids. For example, sewer pipe lines, whether designed for sanitary or storm water drainage, are frequently constructed in a variety of sizes and generally manufactured of vitrified or ceramic material, clay, cast iron, plastic treated paper tubes, or any other durable materials for use in conveying the waste matter. It is well known that when fluids, such as raw sewage, are conveyed for any substantial distance, or are allowed to collect and settle as in septic tanks, sewer lines are provided with vents extending from the underground line or septic tanks to ground level. Also, certain underground utility conduits that retain gas and electrical lines generally have ventilating spur lines or access passageways that connect with the subterranean conduits. Consequently, it is necessary to provide some form of ventilated cover, at ground level, primarily for the purpose of preventing ingress of foreign matter from aboveground.

Heretofore, the customary closure of the vent of a private sewer line has been a perforated circular plate of ceramic or metallic material which fits loosely into the bell of the joint of the sewer pipe which constitutes the upper extremity of the vent line. The commonly called "manhole cover" is a more elaborate version of the same thing for larger sewers, and although such a cover possesses excessive weight, it is quite shallow in depth and may easily be removed by unauthorized persons, or by the jarring passage of vehicles thereover unless it is provided with extrinsic holddown means. Other closures for sewer lines or vent pipes that are presently available are constructed to function as a plug, having a greater depth than the closure just previously discussed. This type closure is also designed for seating within a bell of a normally upwardly disposed pipe, and although the depth of insertion of such a closure in the bell joint provides it with some stability against easy removal, there is a tendency for dirt or other extraneous matter to fill the small

spacing intermediate the bell and the side of the closure, and thereby render it quite difficult of removal when such is necessary. Likewise, any pressure exerted upon such a closure will ordinarily force it into contact against the bell joint and frequently cause breakage of the latter. In view of the foregoing, a cowling device that covers the end of a pipe, which is resistant to the elements, constructed reasonably light in weight, designed for facile insertion or removal upon or from the end of a pipe, but yet is relatively tamper-proof even while free of any extrinsic fasteners, is desirable, and it is the general object of the invention to provide such.

It is another object of this invention to provide a cowling device for use in conjunction with a conduit which may be easily removed by one who is familiar with it without necessitating the use of tools, or requiring the exertion of any extraordinary physical effort.

The foregoing and other objects of the invention are achieved by utilization of the principle that a cowling device in the form of a hood for use in covering the end of a pipe acquires greater stability when its center of gravity is substantially below the upper end of the "stack" or vent pipe extending between the underground conduit and ground level. Such a hood having ventilating spacings in a surface at ground level, and a skirt for surrounding the upper end of the stack for a substantial distance below ground level, achieves a firm seating upon said stack, and may be difficult of removal, especially by the jarring or vibrating type movement of any heavy object or vehicle thereupon. The device of this invention is further structurally reinforced against breakage by incorporating the further principle that a planar surface may sustain a heavier load if it is provided with reinforcing means that project, preferably integrally, in perpendicular relation with the planar surface. More specifically, the cowling device or hood of this invention, regardless of the shape of its covering portion at ground level, includes an integral depending skirt which not only lowers the center of gravity of said device, but also provides structural reinforcement against its own breakage, as well as breakage of the top of the stack or vent pipe.

Other features and advantages of the invention will become apparent to those skilled in the art when the following specification is read in conjunction with the accompanying drawings.

In the accompanying drawings:

FIGURE 1 is a fragmentary elevational view of a conduit and spur line including the cowling device of this invention mounted thereupon;

FIGURE 2 is an isometric view of the cowling device; FIGURE 3 is a vertical sectional view taken on line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary horizontal sectional view taken on line 4—4 of FIGURE 3; and

FIGURE 5 is a diagrammatic elevational view of the cowling device revealing the approximate location of its center of gravity.

In the embodiment shown in the drawings, there is disclosed a standard sewer or conduit line 1, located underground, which may be composed of an arrangement of pipe sections that have been assembled into a continuous pipe line for use in the conveyance of flowable material. Connected intermediate the pipe line sections, as revealed, is a standard T 2 which is provided for accommodating a pipe section 3 that is included within a stack line 4. The stack, as disclosed, may be constructed

to only that dimension necessary for safely providing an egress for the contaminated odors present in the conduit 1, and additionally allow for the entrance of fresh air from the open atmosphere into the line to further ventilate it interiorly. It should be further recognized that the stack, such as 4, may be constructed to manhole size and thereby allow for the entrance of a worker therein for performance of services within the conduit 1, as when it has been constructed to a sufficient size to accommodate a worker. The upper joint of the stack 4 is here shown as a pipe section 5 having its bell 6 overlapping the top edge of pipe section 3, and having inserted and resting upon its upward end 7 the cowling device or hood 8 of this invention.

As shown in FIGURE 2, the cowling device 8 of this invention may be constructed of any sturdy material and in an inverted cup form, or to any other shape or design necessary to provide for its ease of application, in preferably close fitting contact, upon the upward end of the pipe 5. The cowling device is comprised of a plate member 9, which may be substantially planar so as to provide continuity of surface with the ground or street level located proximately therearound. The plate may contain a plurality of openings 10 so as to provide for ventilation of the interior of the spur conduit or stack 4. Projecting angularly downwardly from the plate member 9 is an integral skirt-like portion 11 which is longer than the radius thereof. The skirt 11 is formed as by casting, molding, or by any other method of construction integrally with the plate 9, and may be connected with the same by means of an arcuate corner 12 so as to enhance its appearance, and also provide a transitional area for transfer of the stresses exerted upon said plate into said reinforcing skirt or sleeve 11. Preferably, the skirt may be constructed to extend downwardly for the distance necessary to provide for its stable seating upon the vent pipe or stack 4, recognizing that the greater the length provided in the sleeve portion, the lower will be the center of gravity of the cowling device, effectuating greater stability in its mounting upon the stack, and also making its accidental or unauthorized removal less likely.

In the cowling device 8, as shown in FIGURE 3, the plate member 9 is integrally connected by means of the corner 12 to the skirt portion 11, with the vent openings 10 provided through the surface 9 and arranged directly over the interior open end portion of any conduit section upon which it mounts. Connecting to the inner surfaces of the cowling device proximate the continuous corner section 12 are a plurality of equally spaced lugs 13 each having a downward facing surface 14 of a sufficient area to provide for its stable seating upon the upper end of a pipe section disposed therein after the device has been slidably inserted upon said pipe section. As shown in FIGURE 4, each lug 13 projects inwardly of the skirt a sufficient distance so as to provide a surface 14 that supports the device at rest upon the upper end of the proximate pipe section. It can be seen that any downward impact exerted upon the plate 9 is substantially resisted by the earth surrounding the skirt 11, and once the resistance of the earth has been overcome the remaining forces are transferred through the lug-like members 13 and to the abutting pipe section upon which the series of lug members rest. Generally, pipe sections as presently made for use in forming conduits can accommodate substantial forces exerted in compression parallel with their length, but any substantial bending forces exerted upon them readily cause their fracture. For this reason, a cowling device constructed in accordance with the principles of this invention and placed into use will transfer any downward force, not absorbed by the surrounding earth, exerted upon its integral plate member directly endwise into the proximate pipe section, but that, any skewed or torsional-like impacting force exerted upon the plate creates a stress that permeates and is absorbed by the skirt portion 11 of said cowling device. Thus, although the

downwardly directed components of any forces exerted upon the plate member of the cowling device are transmitted through the lug members directly to the contiguous pipe section and are readily withstood therein, most of the remaining forces are restrained from entering the pipe and are cushioned by means of the cowling device itself or the earth surrounding the latter. The use of such a cowling device is therefore beneficially applied when employed in conjunction with pipe sections that may be constructed of material such as vitrified or ceramic compositions, which are prone to easily break or fail when subjected to multiple stresses. Since the cowling device is only loosely mounted upon the pipe section 5, the torsional stresses are substantially transferred and sustained by the integral skirt member 11, and are not conducted into the contiguous pipe section.

Another desirable feature of the invention is that the cowling device is constructed in accordance with the principle that an autonomous object is rendered more stable as its center of gravity is lowered below the area at which its weight is transmitted to a supporting member. Thus, as shown in FIGURE 5, the cowling device 8, with the plate 9 connected to the skirt member 11, has its center of gravity (c.g.) substantially below shoulder 14, but such center of gravity may be lowered any desired amount by increasing the length of the skirt 11. Indeed, such a center of gravity may be lowered without increasing the weight of the device by appropriately lengthening the skirt and at the same time providing apertures, such as 15, below pipe end 7, a variant which also achieves increased anchorage in the surrounding earth. Therefore, if said device is inserted on the upward edge 7 of a pipe section, the longer the length given the skirt 11 the lower will its center of gravity be disposed, and thereby enhance the stabilization of the cowling device when resting upon said pipe section. For example, it has been found that in a cowling device having an over-all length of approximately six inches from the plate 9 to the bottom of the skirt, that the center of gravity can be computed as fixed approximately one-third of the length below said plate. Hence, if the upper end 7 of a pipe section is located within the cowling device near the plate 9 and supporting its lugs 13, this end of the pipe will be disposed upward from the center of gravity (c.g.), as disclosed in FIGURE 5, and said device will be stabilized against displacement due to any external forces of the kind ordinarily exerted upon the same.

It is to be understood that the above described invention is simply illustrative, and other designs may be readily devised by those skilled in the art which will embody the principles of the invention and naturally be included within the spirit and scope thereof.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. An assembly for encasing and protecting the upper end of a vent stack comprising in combination, a stack extending upwardly from an underground conduit line, an open upper end on said stack substantially flush with the surface of the ground, an inverted cup-shaped hood encasing the upper end portion of said stack, a plate member having openings therethrough forming a part of said hood and overlying the upper end of said stack and substantially flush with the surface of the ground, a skirt portion forming a part of said hood depending from the perimeter of said plate member and externally surrounding said stack, said skirt portion extending below the plate member a distance substantially exceeding the radius thereof and disposing the center of gravity of the hood below the surface of the ground and providing an external surface on the hood for engagement by the ground, and means disposed within said hood and having downwardly facing surfaces engaging the upper end of the stack.

2. An assembly for encasing and protecting the upper end of a vent stack according to claim 1 wherein the

perimeter of the plate member where it joins the skirt portion has an arcuate exterior surface.

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