VENTILATED, UTILITY, APPLIANCE BOX FOR UNDERGROUND INSTALLATIONS

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This invention relates to casing or housing structures in general and to those having a provision for ventilation of their interiors, particularly for the purpose of protectively encasing utility appliances for operation underground.

The invention has grown out of my efforts to solve problems encountered in installing gasoline pumping equipment underground. I have had as principal objections the mounting of all important operating equipment, requiring periodic servicing, in a protective housing or box in such a manner as to render temporary withdrawal thereof for inspection and repairs quick, easy, and convenient, and, further, the provision for forced ventilation of the interior of the box in a simple and economical manner, which does not interfere with the desired temporary withdrawal of operating equipment.

An important feature of the invention in the accomplishment of these objects is the mounting of the operating equipment on a vertically sliding panel disposed in face-to-face proximity with one of the side walls of the box and having a handle at its upper end, thereby affording ready withdrawal from the box of even very heavy equipment. Such equipment is connected to necessary utility service lines, which enter the box through the walls thereof, by means of quickly disengagable couplings. Thus, it is only necessary to uncouple the various items of operating equipment from the service lines in order to render such items available for rapid, guided withdrawal, all together, as an integrated unit.

In this connection, I have found that unusual structural rigidity of the proximate box side wall and of the slideways is advisable to insure against binding of the sliding panel during movement thereof when the box is installed underground. It can be readily appreciated that, in its underground position, the box is often subjected to deforming stresses and strains not present otherwise.

As an important feature of the invention, I provide a particularly advantageous slideway arrangement, which enables the box to be made of relatively light-gauge steel plate without danger of bind with respect to the sliding panel.

For purposes of ventilation where required, as, for example, in the previously mentioned instance of pumping equipment for gasoline or other highly volatile fluid, an exhaust feature of the invention resides in the provision of a vertical exhaust chamber interconnecting or communicating with the interior of the box. Inasmuch as the motor driving the pump is one of the items of equipment mounted on the panel, a vertical and upwardly open slot is provided through the appropriate wall of the exhaust chamber, enabling provision of the motor drive shaft into such exhaust chamber and operation of a suitable blower therein, for forced withdrawal of explosive vapors and gases from the interior of the box proper. Sealing means for the slot and a cover for the exhaust chamber are advantageously mounted, together with the motor and blower, on the sliding panel, for withdrawal therewith in affording convenient access when required.

Further objects and features of the invention will become apparent from the following detailed description of the particular preferred embodiment illustrated by way of example in the accompanying drawings.

In the drawings:

Fig. 1 represents a top perspective view of a ventilated utility appliance box for gasoline pumping equipment, both the cover and the sliding panel being completely removed;

Fig. 2, a top plan view of the same;

Fig. 3, a view similar to that of Fig. 1, but with the sliding panel and thereon-mounted pumping equipment shown in operating position;

Fig. 4, a view similar to that of Fig. 2, but corresponding with Fig. 3 in structure illustrated;

Fig. 5, a composite vertical section and side elevation taken on the line 5—5 of Fig. 2;

Fig. 6, a fragmentary vertical section taken on the line 6—6 of Fig. 2;

Fig. 7, a vertical section taken on the line 7—7 of Fig. 2;

Fig. 8, a similar view, but taken on the line 8—8 of Fig. 4 and showing the cover in place on the box proper; and

Fig. 9, a fragmentary vertical section taken on the line 9—9 of Fig. 4.

Referring to the drawings:

In the particular form of the invention here illustrated, the protective, utility appliance box 1 is of proper 10 fabricated from steel plate or other suitable material to provide opposing side walls 10a and 10b, respectively, and opposing end walls 10c and 10d, respectively. For the purpose of providing a stable footing for the box, such walls are provided with outwardly extending flanges 11 at their lower edges, and, for the purpose of firmly seating a box cover 12, Fig. 8, such side walls are provided with outwardly extending flanges 13 along their upper edges.

Since it is intended that the box be installed underground to the extent of its depth, no bottom wall is ordinarily provided. For strengthening purposes, corner reinforcements 14 may be utilized. The earth at the bottom of the pit which is provided for installing the box will normally be tamped firm, so that the box, as installed, will have a smooth and solid earth floor.

For ease of handling prior to installation, a number of outwardly projecting handles 15 are preferably provided about the upper margin of the box, these being desirably fabricated from standard, concrete-reinforcing, structural rod bent to shape and secured to the box proper by welding. Such handles are cantled downwardly, so as to be securely embedded in the concrete slab (not shown), which is normally cast about the upper margins of the box proper, upon installation.

The particular box here shown serves to house pumping equipment for gasoline service stations. The major operating items of such equipment, namely, an electric motor 16 and pump 17, Figs. 3, 4, and 8, are mounted on a vertically sliding panel 18, disposed in proximity to end wall 10d of the box proper, and provided with a grasping handle 18a.

Such panel 18 is slidably mounted within a slideway formed between a pair of spaced guide elements 19 and a structural framework 20.

The guide elements 19 are preferably structural angles, having respective legs welded in face-to-face relationship with side walls 10a and 10b of the box proper, interiorly of the box and in proximity to end wall 10d, and having
their opposite legs projecting transversely of the interior of the box in spaced opposition to such end wall.

The structural framework 20 is provided for the purpose of reinforcing the proximate end wall of the box and facilitating the sliding action of the panel 18. As shown, such framework comprises transversely extending bars 21 secured at their opposite ends, as by welding, to the side walls 10a and 10b of the box proper 10 and engaging the inner surface of end wall 10d. A pair of vertical guides 22, preferably cylindrical bar stock, as shown, are secured to the transverse bars 21 adjacent opposite ends of the framework, so as to provide side surfaces of spaced opposition to the guide legs of elements 19, the spacing being such as to receive panel 18 in an easy sliding fit.

In this manner, a slideway for the panel 18 is provided, which presents a minimum of frictional resistance to the sliding action of the panel, and which strongly reinforces end wall 10d, bearing against the prop of the panel 18 as well as against any tendency to bulge inwardly when earth is tamped into position about the side walls of such box proper, or at any other time following installation of the box.

It should be noted that the bars 21 traverse the width of end wall 10d, bearing against the same and being preferably welded thereto at intervals along their length. This provides strong reinforcement and a solid base for the vertical slideway bars 22. Because of this reinforcing slideway construction, comparatively light steel plate can be used in the fabrication of the box proper, for example, 12 gauge.

Both panel 18 and the slideway therefor preferably terminate short of the bottom of the box, as illustrated, a shelf 23 extending transversely of the end wall 10d to provide a panel-supporting bottom for the slideway.

For the purpose of protecting the slideway framework 20 from accumulating dirt, which could interfere with free sliding movement of the panel 18, the upper end of the panel is provided with an out-turned flange 18b. In the construction illustrated, where the upper end of panel 18 terminates short of the top of the box proper, flange 18b projects outwardly to the inside face of end wall 10d.

In the present embodiment of the invention, where provision is made for ventilating the interior of the box, a vertical, exhaust chamber 24 is defined laterally of the box proper 10, at the slideway end thereof, by auxiliary box walls 25, 26, and 27 in conjunction with a portion of side wall 10a of the box proper serving in the capacity of a partition. A fan or blower 28, Fig. 8, is operatively connected to the drive shaft extension 16c of motor 16 for positioning within the exhaust chamber 24 when panel 18 is in place within box proper 10, and a vertical slot 29 extends downwardly from the upper end of wall 10a for accommodating such drive shaft extension 16c.

Adjacent the lower end of the exhaust chamber 24, a panel 30 is operatively connected between the interior of the box proper 10 and the interior of the exhaust box auxiliary thereto. Such panel 30 is preferably covered by a grill-work or register 31. Adjacent the upper end of the exhaust chamber 24 is an outlet 32 provided with a connection 33 for a pipe or other conduit 34, Figs. 2 and 4, extending to any suitable vent location.

The fan or blower 28 has a slot-sealing member 35 attached thereto, as by means of pins 36, and also carries, about its discharge end 28a, a wall member 37 arranged to be inset within and to extend across the exhaust chamber 24, dividing the same into a lower intake section 24a and an upper discharge section 24b. Wall member 37 is preferably a sheet of stiffly flexible and resilient material, such as fabric-reinforced rubber, in order to accommodate itself, in sealing relationship, to the inner faces of the auxiliary box walls which define exhaust chamber 24. Slot-sealing member 35 is preferably a part of a bearing assembly 38, provided for the drive shaft extension 16c of the motor.

The box proper 10 is provided with an air-intake opening 40, preferably located in the upper portion of side wall 10b opposite exhaust port 30. Such opening 40 is defined by a threaded boss similar to that shown at 33, which is adapted for connection with a pipe or other conduit 41 extending to any suitable location for the intake of atmospheric air.

Thus, operation of the motor 16 in driving the pump 17 will also actuate the fan or blower 28, and will serve to effect forced ventilation of the interior of the box proper 10 by continuously drawing in fresh atmospheric air and discharging vapors through register 31, exhaust port 30, exhaust chamber 24, outlet 32, and exhaust piping 41. In those instances where, as here, the utility appliance box serves to protectively house gasoline pumping equipment, this provision for ventilating the interior of the box is a safety factor of no small importance.

It should be realized that, following installation of the box proper with its attached auxiliary box, the cover 12 is dropped into place over the otherwise open top, see Fig. 8. Such cover 12 is preferably made of heavy steel plate, for example, three-eighths of an inch in thickness, and is heavily reinforced, as by the longitudinal and transverse ribbing 12. The exhaust chamber 24 is covered by an extension 42 of the cover proper, so as to be fully enclosed during operation of the equipment.

The above-described utility appliance box is preferably installed directly above a gasoline storage tank (not shown). The suction riser 43 from the tank may lead into the box in any suitable manner, preferably through the open bottom of the box, and connects with check-valved piping 43 leading directly to the pump 17, by means of any suitable type of readily disengageable coupling, for example, that indicated 44. The discharge line 45 from the pump 17 to the gasoline dispensing apparatus (not shown) preferably passes through an opening provided in a side wall of the box proper, a pressure relief valve 46 being interposed in the line within the box, and such line being provided with a readily disengageable coupling 47.

Electrical leads to motor 16 are also provided with a readily disengageable connection within the box. For this purpose the electrical leads extend into the interior of the box proper through any suitable conduit, for example, that indicated 48, and connect with a combination safety switch and receptacle 49.

Readily disengageable connection with the electric motor 16 is made by means of a plug-in type of connector 50, provided at the free end of a flexible conduit 51 which carries electrical lead wires directly to the motor. By means of the readily disengageable couplings provided in all piping and electrical lines within the box, it is possible to quickly disconnect the operating equipment mounted on sliding panel 18 from the utility lines with which they are normally connected, so that such sliding panel and the equipment carried by it can be readily withdrawn from the box for either repair or routine maintenance at some convenient location above ground.

Whereas this invention is here illustrated and described with respect to a particular preferred embodiment thereof, it should be understood that various changes may be made, and various other embodiments constructed on the basis of the teachings hereof, without departing from the scope of the claims which here follow.

I claim:

1. A utility appliance box for underground installation, comprising a framework defining a box proper, said sides walls including a pair of mutually opposing walls adjoining respectively opposite sides of a third wall; guide elements secured to the inside faces of the respective opposing walls, in proximity to said third wall, to define a substantially vertical slideway within said box proper in proximity to said third wall; a reinforcing framework secured to said side walls and traversing the width of and bearing against
the inside face of said third wall, said framework being disposed in spaced opposition to said guide element and serving with the latter to define said slideway; a panel slidably disposed within said slideway; a handle at the upper end of said panel; walls defining an exhaust chamber contiguous with but exteriorly of the box proper at and laterally of the slideway, so as to be separated from the box proper by a common partition wall; means defining an air-flow port through a wall of the box proper; means defining an air-flow port through the said partition wall, at a low level thereof; means defining an air-flow port through an exterior wall of the exhaust chamber; means defining a substantially vertical slot in said partition wall extending downwardly from an opening at the upper end of the wall; a motor mounted on said panel, said motor having a drive shaft extending substantially horizontally and elongated in the direction of the exhaust chamber to extend through the slot and into said chamber; and air-circulating means operatively mounted on said motor drive shaft within the exhaust chamber.

2. The combination recited in claim 1, wherein a horizontal partition wall extends across the exhaust chamber, dividing it into lower and upper sections, and a sealing strip for the slot is carried by the drive shaft of the motor, the air-circulating means having an air-flow passage portion extending through said horizontal partition wall.

3. The combination recited in claim 2, wherein a gasoline pump is mounted on the sliding panel in driven relationship with the motor; and wherein gasoline supply and discharge piping and electrical supply lines enter the box proper and disengageably connect with said pump and with the motor, respectively.

4. A utility appliance box for underground installation, comprising side walls defining a box proper, said side walls including a pair of mutually opposing walls adjoining respectively opposite sides of a third wall; guide elements secured to the inside faces of the respective opposing walls, in proximity to said third wall, to define a substantially vertical slideway within said box proper in proximity to said third wall; a reinforcing framework secured to said side walls and traversing the width of and bearing against the inside face of said third wall, said framework being disposed in spaced opposition to said guide elements and serving with the latter to define said slideway; walls defining an exhaust chamber contiguous with but exteriorly of the box proper and laterally of the slideway, so as to be separated from the box proper by a common partition wall; means defining an air-flow port through a wall of the box proper; means defining an air-flow port through the said partition wall, at a low level thereof; means defining an air-flow port through an exterior wall of the exhaust chamber; and means defining a substantially vertical slot in said partition wall extending downwardly from an opening at the upper end of the wall.

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