

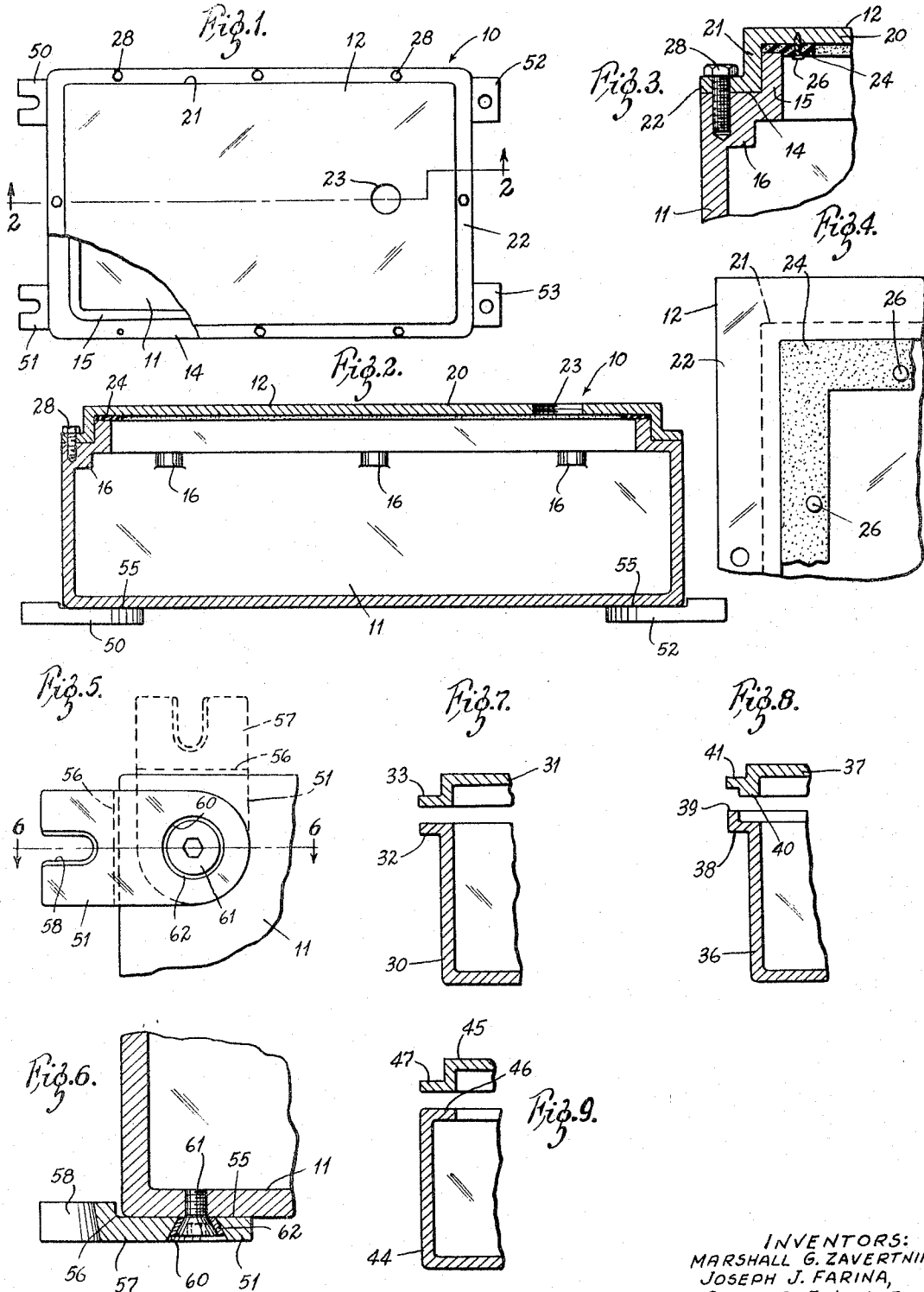
May 2, 1967

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3,317,072

CAST BOX

Filed Aug. 28, 1963



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3,317,072
CAST BOX

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Filed Aug. 28, 1963, Ser. No. 305,113
2 Claims. (Cl. 220—3.8)

The present invention relates to a cast box. In particular it consists of a box that is of the type especially useful as a sealed and explosion-proof receptacle for electrical apparatus that is subject to sparking. The box prevents explosions from occurring and spreading over a wide area of a building or the like. Boxes of this type must be strong and must be entirely sealable if they are to be explosion-proof, as well as moisture-proof. They also must be reasonably accurate in dimensions. Presently most boxes of this type are fabricated from sheet steel, the various panels and parts being welded, ground and finished. Where there are any screw holes, they are tapped. The foregoing is expensive, and not fully satisfactory since it has a greater tendency to leakage.

Efforts to make boxes of this type out of castings fall into the difficulty that they are expensive to make, since heretofore they have required the use of hard cores. In a companion application to this one there is disclosed a method of making a cast box which overcomes the foregoing expense of making hard or baked cores.

The present box, therefore, is cast and consequently can consist of only two principal parts, namely, a box portion and a cover. Each of these parts is, in itself, unitary, being formed of a single cast piece of metal. Therefore this box satisfies the first objective of the invention, which is to minimize the number of pieces required to fabricate the box and to make them integral, rather than artificially sealed or fastened together in order to minimize the possibility of leakage.

The present box is preferably made of cast aluminum and it has a design such that bolt holes can be cast into it or formed in the process of casting, or formed later, but without the necessity of being tapped to receive screws. Self-tapping screws can then be used to fasten the cover onto the box portion. This accomplishes another object of the invention, which is to minimize the cost of making the box and, especially to minimize the number of machining operations that are required.

Another object of the invention is to provide a box that is rigid. The single cast construction of the box, particularly with flanges around the box, makes an extremely strong article. Of course, the flanges aid in obtaining a tight seal and make it possible to obtain long flame paths that will prevent escape of flame from the box. This represents another object of the invention.

A further object of the invention is to provide a seal for the fitting of the cover over the box that can be applied inexpensively and yet which will afford a very tight engagement. Also the seal can be made entirely flame proof and not subject to disintegration under explosion conditions. Finally, the seal can be nailed to the aluminum box parts, thereby eliminating much expense. The foregoing constitute other objects of the invention.

Another object is to provide lugs for the mounting of the box upon a base or other support, which lugs can be separate from the box itself. By making the lugs separate, the casting of the box is considerably simplified. And more importantly, the lugs are designed so that they can be mounted to extend either to the sides or to the ends of the box by very simple mounting change, requiring no more than that they be swiveled about their mounting screws. This constitutes another object of the invention.

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Other objects will appear from the description to follow.

In the drawings:

FIGURE 1 is a plan view of the box with a cover partly broken away;

FIGURE 2 is a vertical section taken on the broken line 2—2 of FIGURE 1;

FIGURE 3 is an enlarged scale view of the fit of the cover on the box similar to the upper left corner of FIGURE 2;

FIGURE 4 is an enlarged scale bottom plan view of one corner of the cover of the box;

FIGURE 5 is an enlarged scale bottom plan view of one corner of the box showing one of the mounting lugs;

FIGURE 6 is a sectional view through the lower corner of the box and the mounting lug taken on the line 6—6 of FIGURE 5; and

FIGURES 7, 8 and 9 are diagrammatic views on reduced scale, portions of boxes and covers, illustrating variant arrangements of the flanges.

The box is generally indicated at 10. It includes the two main portions consisting of the lower box part 11 and the cover 12. The box is illustrated as substantially a parallelepiped, as appears in FIGURE 1, but it can have other shapes if desired. Its walls below the flange should not extend outwardly and downwardly. The drawings do not illustrate the draft left in the walls to enable the hole to be drawn, but it will be understood that such provisions are made.

The top of the box is flanged. In the preferred construction illustrated in FIGURES 1, 2, and 3, the flange extends inwardly, forming a ledge 14 that extends all around the top of the box 11. At the inside edge of the ledge 14, the flange is upturned in a vertical rim 15 that also extends around the box. At certain intervals bosses 16 may be cast into the wall and below the ledge 14 to receive screws as will appear.

The cover 12 has a top portion as illustrated at 20 and a downturned flange 21 extending around the cover. The bottom of the flange 21 has an out-turned ledge or rim 22 also extending around the cover. These flanges and rims preferably have such a size that when the cover is fitted on the box there is a close fit and a long flame path that will extinguish any flames that attempt to escape from the interior of the box. Thus, the flange 21 on the cover 12 fits closely against the exterior of the vertical rim 15 on the box. Likewise the horizontal rim 22 of the cover rests and fits closely upon the ledge 14 of the box. A threaded hole 23 is illustrated to typify posts for connection of switch arms, or like accessories, or hubs, as may be needed.

Around the interior of the top portion 20 of the cover, there is a gasket 24. This gasket can be formed of an appropriate non-inflammable material and for providing explosion-proof properties, should be relatively incompressible, but somewhat yieldable to insure a complete seal.

The box and cover 20 being of cast aluminum, are penetratable by nail-type fasteners. Consequently, the gasket 24 is attached to the cover by nails 26 located at appropriate intervals around the cover. Starting holes may be drilled for the nails, but no tapping is required. The cover has screw holes drilled or cast into it to receive a plurality of screws 28. These are self-tapping screws. The box 11 has the lugs 16 disposed at the points where the screws 28 are inserted.

FIGURE 7 shows a box with a modified form of flange. In this case, the box is indicated at 30 and the cover at 31. The flange 32 projects outwardly and finds a corresponding flange 33 on the cover. Bolts can extend through the two flanges. With appropriately smooth surfaces a flame-proof path is provided.

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FIGURE 8 shows a box 36 and a cover 37. In this case, the flange 38 on the box extends outwardly and terminates in an upstanding rim 39. The cover has a lower rim 40 and an outstanding flange 41. As will be seen, these parts interfit to provide a flame-proof path that extends outwardly and then upwardly.

In FIGURE 9, the box 44 and cover 45 are illustrated with horizontal flanges. The cover 44 has an inturned flange 46. The cover may have an out-turned flange 47 rather than an inturned one, since such is easier to fasten together. These variations on flanging arrangements are less desirable ordinarily than the one illustrated in FIGURES 1-4 for reasons of strength, rigidity, sealing, and proof against explosion.

Referring to FIGURES 1-6, the box 11 is shown as having a plurality of lugs 50, 51, 52 and 53 at the corners thereof. These lugs may be provided with holes or slots to receive screws as is indicated. The particular construction of the lugs is preferably that illustrated in FIGURES 5 and 6, which illustrate, for purposes of example, the lug 51.

This lug 51 has a top surface 55 that fits against the bottom of the box 11. Outwardly from this surface there is a vertical step or shoulder 56, and then an outer lug portion 57 here shown as having a notch 58 in it. The lug construction is the same whether it be provided with a notch 58 or a hole, as in the lugs 52 and 53.

The part of the lug under the box has a tapered hole 60. Preferably this hole is somewhat larger than the screw 61 that passes through it to give some leeway in adjustment. The screw 61 has a conical head on it and preferably has a hollow head to receive a hexagonal wrench. A conical washer 62 surrounds the head of the screw. When the screw is tightened, the shoulder 56 engages around the vertical side of the box 11 with the result that the lug is held tightly and non-rockably in place by the single screw. However, since the screw 61 is located along a line at a 45° angle to both of the adjacent intersecting sides of the box, this screw can be loosened and the lug turned around to the dashed line position illustrated in FIGURE 5. Then, when the screw is retightened, the lug is securely held in the same manner on the bottom of the box in this different position.

By not having the lugs molded onto the box, this additional flexibility is made possible. Also, the lugs would add a complication to the casting of the box.

From the foregoing it may be seen that a box is here provided that can be cast so that it consists of essentially, two cast parts, namely, the box part and the cover part that preferably are of aluminum. It has a flame-proof joint between the cover and the box; it can have inturned or out-turned flanging with upturned or downturned rims; it is very strong and rigid because of the box construction and especially because this is enhanced by the integral flanging around the top; it can have thick walls that are unitary with each other and with the bottom so that leaks

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do not occur. When it is made of aluminum, it can be tapped with self-tapping screws, thereby eliminating the tapping step. As noted in the companion case, it can be given depth as desired by a simple expedient used in the casting process.

In this description and claims, reference is made to the bottom, the top and the sides. It is understood that these are references made for convenience, and that the box can be used in any position.

Various changes and modifications may be made within the process of this invention as will be readily apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of this invention as defined by the claims appended hereto.

What is claimed is:

1. In a box: a main, open-top, lower box part having a bottom and side walls, and having a substantially horizontal flange around the top having a smooth sealing surface, an upstanding rim adjacent the horizontal flange, also having a smooth sealing vertical surface, all of the foregoing being a single, unitary cast metal piece, and a cover having a top wall and side flanges, the side flanges having bottom, horizontal, sealing surfaces that match with horizontal surfaces on the flange, and having vertical surfaces to match with those on the flange and said sealing surfaces on the box and cover having a width extending unbroken all around the cover and box part to afford surfaces of sufficient width to constitute a frame and explosion barrier; means to clamp said cover and box part flange surfaces in tight engagement; a gasket clamped between the top and box part, the cover being of aluminum and means securing the gasket to the cover.

2. The box of claim 1 wherein the flange on the lower box part extends inwardly and horizontally to the upstanding rim, and the rim extends vertically from the inside edge of the flange, thereby providing the horizontal surface, the vertical surface and the rim edge, and the cover flange having the vertical surface fitting around the vertical surface of the rim, and an outstanding flange with a horizontal surface engageable against the horizontal surface of the flange on the lower box part.

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