Sept. 18, 1951 E. P. SMITH 2,568,518

GASPROOF RECEPTACLE

Filed Aug. 15, 1947

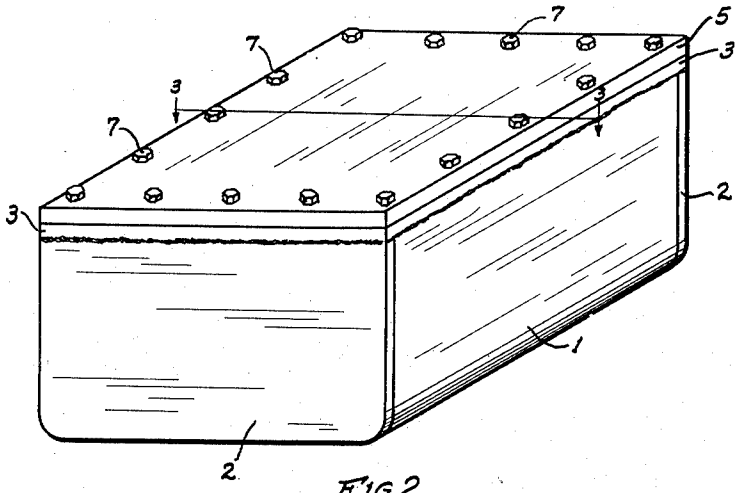


FIG. 2

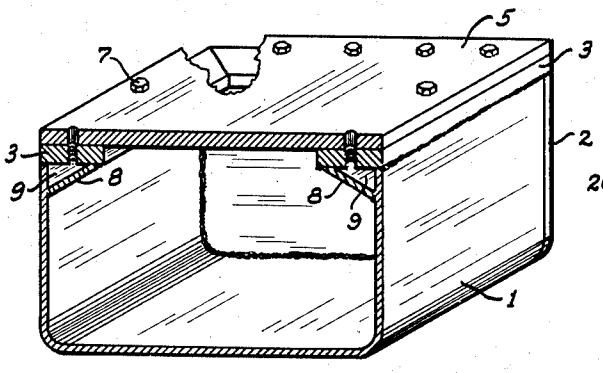


FIG. 3

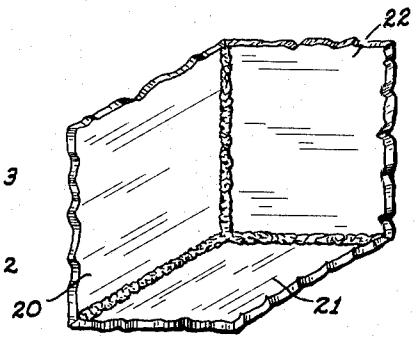


FIG. 6

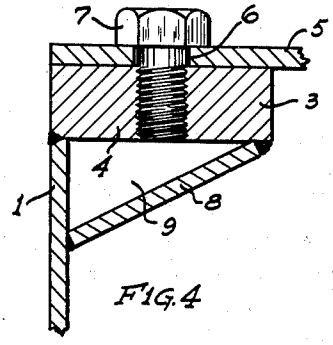


FIG. 4

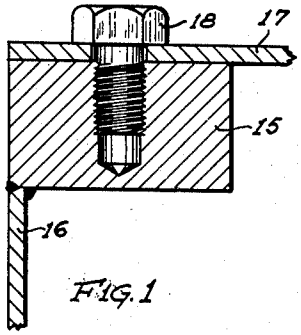


FIG. 1

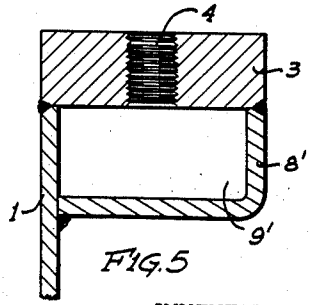


FIG. 5

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Patented Sept. 18, 1951 2,568,518

UNITED STATES PATENT OFFICE

2,568,518

GASPROOF RECEPTACLE

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Application August 15, 1947, Serial No. 768,765

4 Claims. (Cl. 220—75)

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This invention relates to an explosion-proof box and the method of manufacturing same and has particular use in mines and other planes where gases, especially of an explosive character, are present.

At the present time explosion-proof boxes or enclosures are required in mines, etc., and must meet certain requirements set by Federal authorities.

These boxes are used among other purposes to enclose electrical apparatus, especially such apparatus as may produce an arc as in the case of opening a circuit breaker or switch for an electric circuit.

Present rules and regulations are such as to require the box to be so designed that an explosion therein will not ignite an explosive mixture outside the case. This is now accomplished by providing rigid metal-to-metal joints with sufficient width and small enough clearance between cover and flanges to cool the hot gases resulting from an internal explosion below the ignition point.

Gaskets are not permitted to be used and the flange width is usually not less than one inch and any clearance is usually limited to four-thousandths of an inch or less.

The flanges must have considerable rigidity to maintain this clearance during an explosion without excessively close spacing of the bolts. Further it is required that the explosion-proof characteristics of the case shall not be impaired by the omission of a few bolts.

It is the purpose of this invention to provide a gas-proof receptacle for use in mines and other gaseous surroundings which shall be safer than the receptacle described above and which meets present requirements.

Referring now to the drawings forming part of this specification—

Fig. 1 is a limited cross-section of an approved joint construction described above.

Fig. 2 is a perspective view of my improved receptacle.

Fig. 3 is a reduced section on a vertical plane through the line 3—3 of Fig. 2, omitting the bolts cut by the plane.

Fig. 4 is an enlarged partial section of the improved joint construction of Fig. 1 with bolt.

Fig. 5 is a section of another form of the joint construction which may be used to advantage in some cases.

Fig. 6 shows a fragment of a corner of the receptacle of a different construction from that of Fig. 3.

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In a preferred embodiment of this improved receptacle a bottom and side member 1 is formed from metal, preferably steel, by any well known method. The member 1 is shown with rounding edges.

End members 2 are cut from proper metal to fit the ends of member 1. These end members are shown as welded to the end edges of member 1; the welds being preferably on the inside of the receptacle, but outside seams can be used if desired. The end members 2 may be formed to fit within the member 1 at the ends thereof if so desired.

A right-angularly shaped flange 3 of relatively thick metal as compared to that of the walls of the recessed member 1 to give rigidity to the flange, preferably steel or the same as the members 1 and 2, is welded to the members 1 and 2 at their upper edges as shown in Figs. 3 and 4 and extends inwardly at right angles to the inner face of the members 1 and 2 and parallel to the bottom wall and the flange is plain, that is, the outer face at least is in a common plane.

This flange 3 is provided with threaded openings 4 which extend through the flange 3, and the cover 5 made to cover the opening of the receptacle, is also provided with non-threaded openings 6 registering with the threaded openings in the flange 3, to receive the securing bolts 7.

The threaded openings may be made in the flange 3 either before or after the flange is welded in place.

In order to prevent a flash from within the receptacle passing through one or more of the openings 4 and 6 should the bolts 7 be inadvertently omitted, a second flange or brace member 8 is provided as shown in Figs. 3 and 4 and welded to the side and end walls of the member 1 and to the flange 3, thereby forming a hermetically sealed cavity or conduit 9 with respect to the interior of the receptacle. The member 8 which performs both as a brace for the flange 3 and a wall of the cavity or conduit 9, need be no thicker than the metal of the side wall.

The welded seams are shown in the various figures by their heavy black formations, a method common in such cases.

The member 8 forms a brace for the flange 3 thereby permitting the use of a thinner bar for the flange as compared with that of present constructions (Fig. 1) still having sufficient rigidity to maintain its upper surface in a common plane and undistorted by explosions internal of the receptacle.

This present invention also permits drilling

and tapping the bolt holes entirely through the flange into the cavity or conduit 9 thus making an easier and safer machining job than attempting to drill and tap the bolt holes partially through the flange as in present constructions (Fig. 1). If a hole breaks through the flange and if the bolt should at any time be omitted from this hole by error the explosion-proof characteristics of the devices are lost.

In Fig. 1, the present construction, the flange 15 is much heavier than the flange 3 on the herein proposed construction and is drilled and tapped only part way through the flange. The flange 15 is however welded to the wall 16 as in the cases of Figs. 3 and 4 and the cover 17 is attached by bolts 18.

In Fig. 5 is shown a modified brace 8' which is welded to the side wall 1 and flange 3 as in the case of Fig. 4 and thereby forms the receptacle 9'.

The flange 3 extends entirely around the receptacle with corners mitered and welded (Fig. 3) and no openings other than the threaded openings 4 and also the braces 8 and 8' are intact at the corners and welded.

Fig. 6 shows a modified construction of the receptacle in which the member 1 of Fig. 3 comprises three pieces, two side walls 20 and one bottom member 21 welded together and to the end members 22.

Having described my invention, what I claim is:

1. A gas proof receptacle comprising an open top recessed member with side and end walls forming right angled corners, an inwardly projecting flange secured directly to the recessed member at its rim formed by the edge of the walls and extending entirely around the periphery of the member, the outer face of the flange forming a continuous and even bearing surface with all points in a common plane and the said surface positioned above the said rim, the thickness of the flange being greater than that of the walls of the recessed member, a brace member extending around the recessed member within the recess thereof and secured to the flange and to the walls of the recessed member, the brace member being so welded to and associated with the flange and walls as to form a continuous closed conduit around the recessed member at the rim thereof, the walls forming one side of the conduit, the flange provided with a plurality of spaced threaded openings opening into the conduit, a cover member of metal positioned on the said outer face of the flange to close the opening in the recessed member, the cover member having non-threaded openings therethrough registering with the threaded openings in the flange, threaded fastening means in each opening to draw the cover member into close engagement with the bearing surface to prevent escape of ignited gases from within the receptacle.

2. A recessed member for use with a gas proof receptacle comprising a metal member provided with side and end walls and a top opening, a flange extending inwardly from the free edge or rim of the walls and having one exposed even surface with all points in a common plane, the flange being separately formed and welded directly to the said walls at their edge or rim, a second member positioned within the recess of the receptacle member, the said second member being separately formed and continuous and welded directly to the flange and to the walls of the recessed member, the said walls and flange and second member being so constructed and related to each other as to form a continuous cavity extending around the rim of the side and end walls and sealed with respect to the interior of the recessed member and the said exposed surface of the flange positioned above the free edge of the said walls, the flange formed of metal of greater thickness than that of the said walls and second member, the flange provided with a plurality of spaced and threaded openings extending through the flange into the said cavity to receive fastening means whereby a cover may be secured to the flange in sealed relation to the said even surface thereof.

3. A receptacle comprising a recessed member having walls on all sides except one forming a right-angular shaped opening, a separately formed flange of metal mounted upon the transverse edge face of the side and end walls of the recessed member at the open end thereof, the flange extending parallel to and projecting inwardly with respect to the upper edges of the side and end walls and secured to the said edges of said walls, the flange having a thickness greater than that of the said walls and provided with a smooth even outer bearing surface, a cover positioned on the said bearing surface of the flange, the flange provided with spaced threaded openings extending therethrough, the cover provided with a smooth even bearing surface cooperating with the first said bearing surface, the cover provided with non-threaded openings registering with the threaded openings, fastening means extending through the non-threaded openings into the threaded openings to draw and hold the bearing surface of the cover in close sealing engagement with the outer bearing surface of the flange for the purpose described, separately formed means of metal welded to the flange and to the adjacent walls of the recessed member and positioned within the recessed member to brace the flange with respect to the walls and to form a closed channel means along each side and end wall to hermetically seal the threaded openings in the flange from the interior of the recessed member and from the exterior thereof when the cover is in place for the purpose described.

4. A gas proof receptacle comprising, a recessed member provided with side and end walls and one bottom wall and having one open side, a separately formed flange having a plain even bearing face extending around the one opening of the recessed member, the flange extending parallel to and projecting inwardly with respect to the upper edges of the side and end walls and secured to the said edges of said walls, a separately formed closing member extending around the recessed member and secured to the flange adjacent its inner edge and to the adjacent walls of the recessed member at points spaced from the edge thereof, the plane of the closing member being obliquely disposed to the respective planes of the said side and end walls and of the flange, the flange and closing member and the included walls of the recessed member forming a continuous closed cavity sealed with respect to the interior of the recessed member, a cover having a plain even bearing surface cooperating with the bearing surface on the flange, and threaded openings through the flange and registering non-threaded opening

through the cover, and fastening means cooperating with the threaded openings to secure the cover in place as described.

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