April 7, 1925. 1,532,898

W. E. HOLLAND

BOX HANDLE

Filed March 6, 1920

Fig. 1.

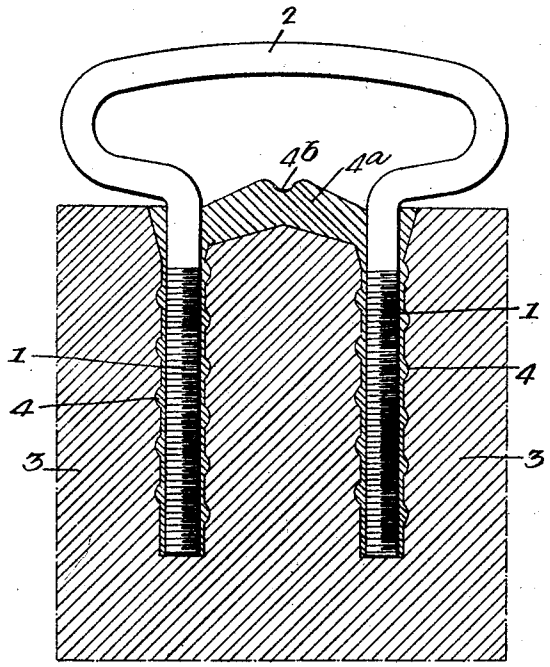



Fig. 2.

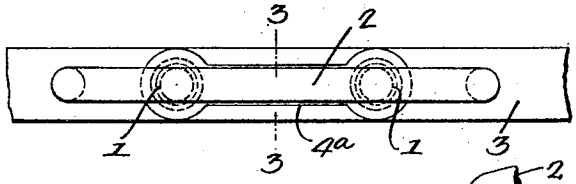



Fig. 3.

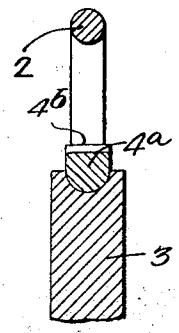
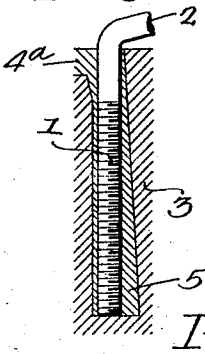



Fig. 4.




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# UNITED STATES PATENT OFFICE.

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## BOX HANDLE.

Application filed March 6, 1920. Serial No. 363,720.

*To all whom it may concern:*

Be it known that I, WALTER E. HOLLAND, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented Box Handles, of which the following is a specification.

One object of my invention is to provide a simple substantial and inexpensive box handle, especially adapted for use on battery cases or trays, which shall not project beyond the end of the box and which shall be strong to resist horizontal as well as vertical strains.

Another object of the invention is to provide a novel means or device for securely fastening and holding a handle in a box end or side which shall so surround and enclose the handle ends as to protect them against corrosion by battery electrolyte, and which shall make a tight joint with the wood of the box, as well as with the handle ends, such as to prevent the entrance of liquid into the handle receiving recesses.

These objects and other advantageous ends I attain as hereinafter set forth, reference being had to accompanying drawings, in which,

Fig. 1 is a vertical section of a part of a battery box or case, illustrating my handle and means for fastening it thereto.

Fig. 2 is a plan of the structure shown in Fig. 1;

Fig. 3 is a transverse section on the line 3—3, Fig. 2; and

Fig. 4 shows an alternative construction of the undercut recess, in the box member, which may be made by redrilling at an angle to the first drilling or by burning with a special heated tool.

In order to facilitate the handling of storage batteries, the wooden boxes or trays in which the cells are mounted, are usually provided with a pair of handles, mounted to project above their ends and, in accordance with my invention, such handles are preferably made of a length of metal rod or wire bent or formed to have a flattened elliptical body 2, from which the rod ends project in parallel lines. A portion of each of these ends is preferably corrugated, threaded or otherwise roughened or deformed so as to be more securely held by the fastening means hereafter described. Each of the ends of the box 3 to which these handles are to be applied, is preferably provided with a pair of parallel holes extending into it from its top edge, and these holes are preferably threaded or otherwise undercut by means of a suitable tap or cutting tool. The threads or grooves thus formed in the holes of the wood or other material of the box are preferably relatively coarse and of steep pitch, and the upper edge of said box 3 may have a channel or recess extending between and connecting the upper ends of said holes. The holes are also preferably flared at the top.

In assembling, the ends 1 of the handle are introduced for the desired distance into the holes in the structure 3, and melted lead, alloy, or other material such as sulphur having a relatively low melting point, is poured into the recess connecting said holes, preferably at a point midway between the same. Since the holes and particularly the threads in them are of a diameter in excess of that of the rod ends 1, the molten material 4 flows freely into them for their entire length and not only fills them, but fills also the connecting recess as indicated at $4^a$.

Upon the solidification of the molten material, the handle is thus rigidly and permanently connected to the wood box 3, or other structure in which it is mounted, for obviously the tubular body of metal which is cast in each of the holes not only fits into the notches or grooves of the handle end 1 therein, but also enters and conforms to the shape of the threads, or undercut recesses, of said holes. It thus forms a relatively strong structure which is in the most intimate contact with the handle end 1, as well as with the walls of the hole in which said end extends, so that liquid is excluded from the surfaces of these parts; and if desired the ends of the handle as well as the body thereof may be coated, plated, or otherwise provided with an adherent metal or other covering, resistant to the battery electrolyte, with which the filling material 4 will unite or bond so that the material of the handle is effectively protected from corrosion.

If desired, the notches or threads may be omitted from the handle ends if these ends are plated, coated or otherwise so prepared that the filling material 4 will bond or closely adhere to and make a rigid and practically integral connection with them. The gate or connecting portion, $4^a$, which extends be-

tween and connects the tubular masses 4 in the holes, makes possible the filling of both recesses at one pouring and serves to tie together and brace the upper portions of the ends 1 of the handle. If desired each of these connecting portions may be shaped as shown at $4^b$, by means of a suitable mold, to provide a notch or recess for the reception of a hold-down hook, whereby the battery may be secured against movement.

It will be seen that the structure is particularly well adapted for use on electric batteries where it is important that the handles shall be strong, both longitudinally and transversely, and where the parts and fastenings shall be protected from the action of electrolyte, which may come out of the battery cells. Also it is evident that the handle is inexpensive as well as quick and easy to mount for use, and that the overall battery length is not increased by the addition of the handles.

In Fig. 4 I have shown an alternative construction of the undercut recesses in the box member, which may be formed by redrilling the hole originally formed, by means of a drill operated at an angle to the line of said first hole, or may be made by burning out the original hole by means of a special heated tool. Thereafter the molten material may be poured in the holes so formed and owing to its shape when solidified and to its adherence to or engagement with the grooves of the handle ends, these latter are rigidly held in place and entrance of liquid is effectually prevented.

I claim:—

1. The combination of a box member having an undercut recess; a handle member extending therein; with a cast material in the recess bonded to the handle member.

2. The combination of a box member having an undercut recess; a grooved handle member extending therein; with a cast material in the recess, engaging the grooves of said handle member.

3. The combination of a box member having a threaded recess; a handle member extending therein; and a cast material in the recess entering the threads thereof and holding the handle member therein.

4. The combination of a box member having a threaded recess; a grooved handle member extending therein; with an intermediate cast material engaging the grooves of said threaded recess and of the handle member.

5. The combination of a battery case having a wall with two substantially parallel undercut holes therein; a handle having grooved portions extending into said holes respectively; and a cast material in the holes for retaining the handle in position.

6. The combination of a box member having undercut holes therein; a handle member having two portions provided with non-corrosive coatings and extending into said holes; with a solidified cast material filling the holes and bonded to the coating of the handle member.

7. The combination of a box member having two threaded holes; a length of rod material shaped to form a handle and having grooved end portions extending into said holes; with solidified cast material in the holes for retaining the ends of the handle member therein.

8. The combination of a box member having two substantially parallel undercut holes; a length of rod material shaped to form a handle member and having grooved end portions extending into said holes; with solidified cast material in the holes for retaining the ends of the handle member therein.

9. The combination of an open-top box having two pairs of undercut holes extending into two of the sides thereof from their top edges; with two handles each having projecting grooved portions extending into the holes respectively of one side; and solidified cast material in the holes surrounding the projecting portions of the handles.

10. The combination of an open-top container; two pairs of undercut holes extending into the top edges of two of the sides thereof; with two handles each having projecting grooved portions extending into the holes respectively, of one side; and solidified cast material surrounding the projecting portions of the handles in the holes and extending between said projecting portions of each handle.

11. The combination of a box member having a pair of undercut holes extending into its top edge; with a channel connecting the pair of holes; a handle having projecting portions extending into the holes of the box member; with solidified cast material surrounding the projecting portions of the handle in the holes and in the channel connecting the pair of holes.

12. The combination of a box member formed with handle recesses; a handle having portions extending into said recesses; with solidified cast material in the recesses and extended between portions of the handle to receive a hold-down hook.

WALTER E. HOLLAND.