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WALL STEP

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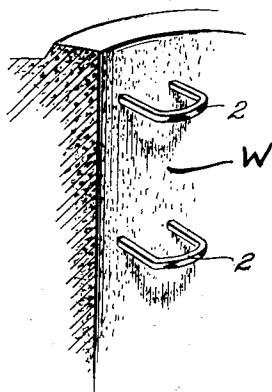


FIG.-1

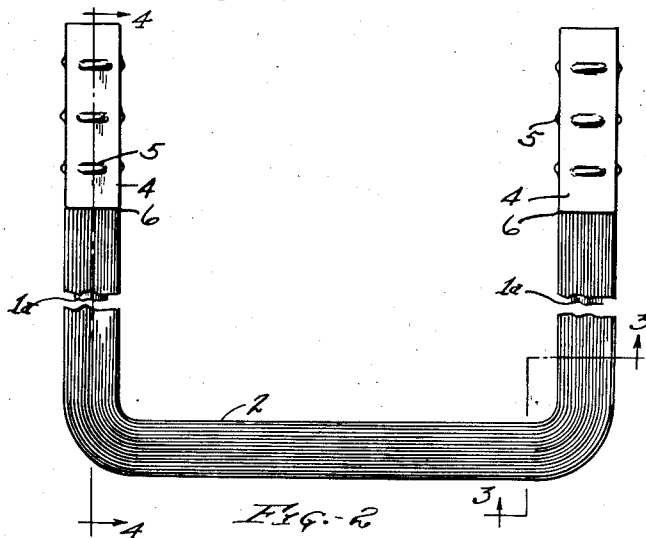


FIG.-2

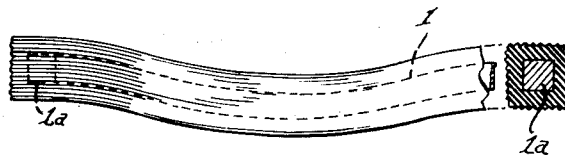


FIG.-3

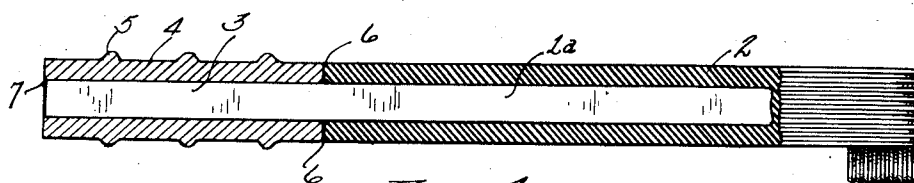


FIG.-4

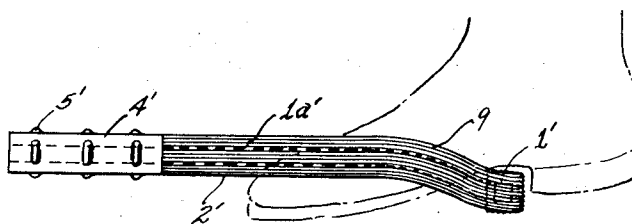


FIG.-5

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WALL STEP

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8 Claims. (Cl. 72—100)

This invention relates to a step for use in connection with walls and structures such as masonry walls, retaining walls, manhole walls, electrical towers and the like and particularly to a new and improved step adapted to be imbedded in brick or masonry walls of manholes.

In manholes and similar structures in which steps are usually provided secured in place by imbedding in the wall, the conditions to which the steps are exposed causes them to deteriorate rapidly with well known resultant dangers and replacement expense. Not only are the steps exposed directly to the moisture and continued dampness for long periods of time and almost constantly but also to chemicals in the water and sewage and deleterious fumes emanating therefrom. The rapid corrosion, pitting and deterioration of such steps from these various other causes are well known and it is the principal object of the present invention to provide steps for this purpose which will withstand such severe conditions to which subjected in use.

Again, due to the constant exposure to dampness and moisture, the steps become slippery providing only a precarious foot-hold for workmen and another object of the present invention is to provide a step which affords a surer foot-hold.

A more specific object is to provide a step, the portions of which exposed to the workman are of electrically non-conducting material so to afford protection to some degree from electrical currents and the like, and which will not stick to the hand when extremely cold.

Still another object is to provide a step which is strong and durable and which is so constructed that it is practically unaffected by the adverse conditions of use.

Other objects and advantages will become apparent from the following specification wherein reference is made to the drawing.

In the drawing:

Fig. 1 is a view of a manhole wall partly in section showing the device of the present invention installed;

Fig. 2 is a top plan view of a step embodying the principles of the present invention;

Fig. 3 is a front elevation of the step illustrated in Fig. 2, part thereof as indicated by the line 3—3 of Fig. 2 being shown in section for clearness in illustration;

Fig. 4 is an enlarged sectional view of the step taken on the line 4—4 of Fig. 2;

Fig. 5 is a reduced side elevation of a modified form of the step of the present invention.

Referring to Figs. 1 to 4 inclusive, the preferred embodiment of the present invention is shown for purposes of illustration installed in a manhole side wall W so as to project inwardly of the manhole in the usual manner.

The step comprises a rigid weight supporting bar preferably of metal such as steel which will withstand five hundred pounds weight at the end of a five inch overhang. The bar, when used in flat walls, is bent into U-shape as is customary for such installations, the base of the U forming a tread portion and the arms 1a thereof providing means to be imbedded in the wall for securing the step thereto. The bar is preferably square in cross section for purposes later to be described.

Secured on the bar and preferably entirely enveloping the tread portion 1 thereof and the portions of the arms 1a adjacent the tread is a rubber casing. For economy in manufacture and because of other advantages obtained, this casing is preferably in the form of an impervious, tough square rubber tube 2, the central passage of which is preferably of the same shape as the bar but slightly smaller in cross section. After the bar is bent, the tube is expanded by inflating and in the expanded condition it is slid onto the bar and upon release of the expanded pressure tightly grips the bar throughout the length of the tube.

The tube 2 terminates part way of the length of the arms 1a, leaving the end portions 3 thereof unincased therein. Mounted on the end portions 3 are hollow sleeves 4 preferably of cast iron or other highly rust resisting material. The sleeves 4 are configured internally to snugly embrace the end portions 3 of the arms and each is of such length as to extend from the corresponding end of the rubber tube to the outermost end of the arm. The sleeves 4 are secured in fixed longitudinal position on the arm portions 3 by any suitable means, preferably by spot welding, so that the bar cannot be withdrawn longitudinally of the sleeves. The sleeves are configured on their exterior, as by bosses 5, so as to afford a rough surface for firmly embedding into the wall W in which the step is mounted, thus preventing longitudinal withdrawal of the sleeves from the wall.

In order to fully protect the step, the ends of the tube 2 are in sealed engagement with the bar 1, by virtue of the fact that the tube is contracted so firmly thereabout. Also, it is desirable to insure sealing by provision of a suitable cement between the interior of the tube and the bar, especially at the ends.

The sleeves 4 firmly abut the respective ends of the tube and likewise are preferably sealed to the bar with a suitable cement or by welding, soldering and the like, both at the end abutting the tube 2 and at the outermost end. The joints 6, between ends of the sleeve and tube are also sealed with a suitable cement or sealing material or by welding as also is the outmost end of the sleeve, as indicated at 7, to prevent entrance of moisture into contact with the bar.

It is well known that neither cast iron nor rub-

ber will deteriorate very rapidly due to moisture and fumes of various types and since the bar is fully protected thereby so that no moisture can reach the same it will last indefinitely.

5 The step is installed in the wall by embedding the arms 1a part way therein, preferably beyond the joint 6 so that a part of the rubber casing is disposed within the wall. In the most generally used form, the sleeve 4 is from 5 to 7 inches
10 long and the portion of rubber casing on the arms being about 8 inches long, the step being installed with 3 inches of the rubber encased portion of the arms embedded in the wall, thus leaving a 5 inch overhang to the tread 1.

15 The tread portion 1 of the step is bent downwardly from each end toward the center as indicated in Figs. 3 and 4 so that if the workman's foot slips, it will always tend to slide toward the center. Thus the lateral abutment is provided
20 to prevent the workman's foot from slipping off sidewise. Another means of accomplishing this result is illustrated in Fig. 5 wherein the tread may be perfectly straight or bent as illustrated in Figs. 3 and 4, but the arms 1a' bent down-
25 wardly at the ends adjacent the step, as indicated at 9 so as to form in effect lateral abutments so positioned as to engage the workman's foot as it moves sidewise on the step and thereby prevent it from slipping off.

30 A decided advantage in using a rubber tube and non-circular bar is that there is no tendency for the rubber to twist on the bar under torsional stresses, because of the interlocking of the non-circular bar with the noncircular passage in the
35 tube and also because of the fact that the integral tube is curved at the ends at an angle to the axis of the tread and these end portions, so disposed, will withstand a severe torsional stress on the step without permitting it to turn appreciably.
40

While I have described the step particularly in connection with a manhole wall, obviously it may be used for other purposes and it is very desirable for electrical towers and the like, in
45 which case it would be made in the same manner but with less overhang and any suitable means provided for engagement with the outside of the bosses 4 for securing the step in place: the important features being that the weight supporting element of the step is thoroughly protected and practically hermetically sealed and the tread
50 affords an electrically nonconducting hand grip and one which will not stick to the hand when extremely cold. Regardless of the fastening used
55 for securing the step to a wall, or other means, it should be such that the bar is sealed from outside atmosphere.

Having thus described my invention, I claim:

60 1. In a masonry wall, having the known arrangement of a metal bar, rigidly embedded therein at one end, the bar having a portion projecting outwardly from the surface of the wall to serve as a step, the combination of an
65 impervious rubber casing entirely enveloping the outwardly projecting portion of the bar and extending for a substantial distance within the masonry material, whereby the inner end of the rubber casing is in operative effect sealed by the masonry material.

70 2. A step of the character described, comprising a bar of rigid weight supporting material adapted to be secured in fixed relation to a wall while protruding therefrom, a tubular rubber

casing enveloping the protruding portion of the bar to protect the bar and form a friction tread thereon, the bar having an external surface which is non-circular with relation to the axis of the bar and the casing having an internal surface in
5 tight face-to-face contact with the non-circular surface of the bar in a manner to prevent turning of the casing with respect to the axis of the bar.

3. A step of the character described, comprising a rigid weight supporting bar, a tough rubber
10 casing thereon in sealed engagement therewith, and means including relatively sharply bent portions of the bar tightly embraced by the casing to retain the portion of said casing which serves as the tread surface in fixed peripheral position
15 against rotating on said bar.

4. A step for the purposes described comprising an impervious protective casing, a U-shaped weight supporting bar, the legs of which pro-
20 trude from the casing, the intermediate portions of the bar being enveloped in the casing, and means including external surfaces on the bar and internal surfaces of the casing coacting in a manner to prevent relative turning between the intermediate portions of the bar and the en-
25 veloping portion of the casing, the end portions of said casing being in sealed engagement with the bar for excluding moisture and foreign matter from contact with the enveloped portions of the bar.
30

5. A step comprising a generally U-shaped metal bar, the legs of which are bent abruptly from the base portion and adapted to be secured in a fixed support, and a one-piece rubber casing intimately enveloping said base portion and ex-
35 tending for a substantial distance along both said legs in firmly embracing relation therewith, whereby the portion of the casing enveloping the base portion of the bar is prevented from turning about the axis of the bar.
40

6. A step comprising a weight supporting bar, a rubber tube enveloping said bar intermediate its ends and in sealed engagement therewith, means for securing the end portions of said bar
45 to a wall to retain the bar in substantially horizontal position whereby a portion of said bar intermediate the end portion forms a tread, said bar curving downwardly toward a mid portion of the tread.

7. A step of the character described compris-
50 ing a rigid weight supporting bar, a rubber casing enveloping the bar intermediate the end portions of the bar and sealed to exclude atmosphere therefrom, sleeves of rust resisting material on the end portions of said bar and substantially
55 abutting the ends of said rubber casing, the joint between the sleeves and casing being sealed to exclude outside atmosphere from the portion of the bar covered by said sleeves and casing.

8. A step of the character described compris-
60 ing a bar of weight supporting material, an impervious, rustless casing intermediate the end portions of said bar enveloping said bar to exclude outside atmosphere therefrom, sleeves of impervious rust resisting material on the end
65 portions of said bar and abutting the ends of said casing, the joint between the sleeve and casing being sealed to exclude outside atmosphere from the bar and said sleeves being welded to the bar to seal the outer ends of the sleeves to the bar
70 to exclude outside atmosphere from entering within the sleeve from said end.

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