No. 895,412. PATENTED AUG. 11, 1908.

A. C. BADGER.

METHOD OF FORMING COMPOUND RECEPTACLES.

APPLICATION FILED JAN. 2, 1906.

Fig. 1.

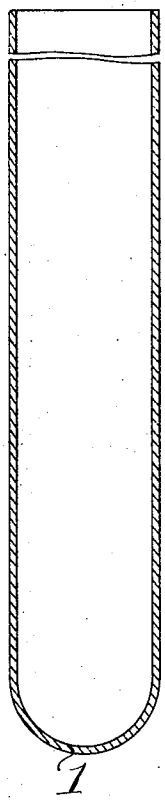


Fig. 2.

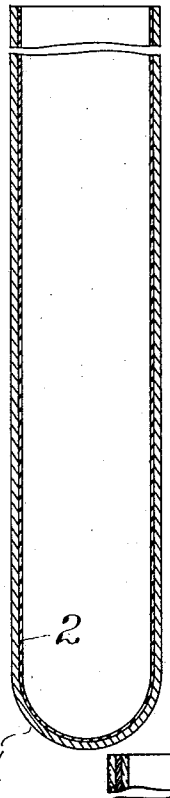


Fig. 3.

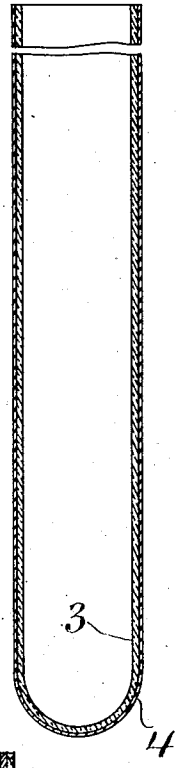


Fig. 4.

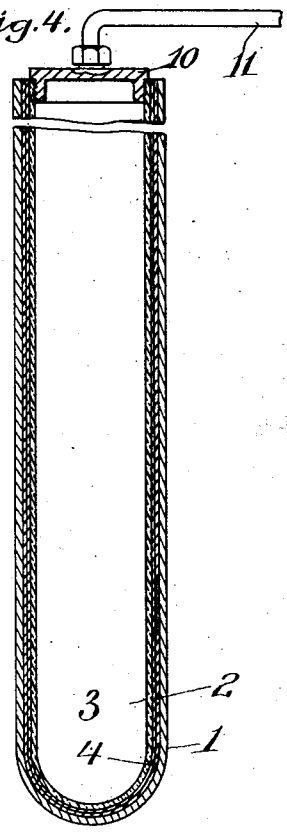
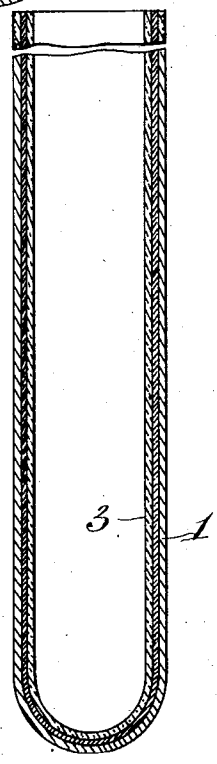


Fig. 5.



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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING COMPOUND RECEPTACLES.

No. 895,412. Specification of Letters Patent. Patented Aug. 11, 1908.

Application filed January 2, 1906. Serial No. 294,042.

To all whom it may concern:

Be it known that I, ARTHUR C. BADGER, of Newton Center, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Methods of Forming Compound Receptacles, of which the following is a specification.

This invention relates to a new and improved method of making compound tubes or receptacles.

Figure 1 shows a sectional view of the outer member of a receptacle to be made in accordance with my invention. Fig. 2 is a like view showing the inner wall of the said receptacle covered with a coating of solder. Fig. 3 is a sectional view of the inner member having its outer surface covered with a coating of solder. Fig. 4 is a view showing the inner member nested in the outer member, their complementary solder coatings in engagement, and a conventional cap closing said inner lining and connecting with any suitable air-pressure supply. Fig. 5 is a sectional view, showing two solder coatings united, and the inner and outer member bonded uniformly together.

Heretofore, great difficulty has been experienced in forming a vessel, or receptacle, of two different metals, as steel and lead, or tin, owing to the difficulty experienced in securing the uniform union between the inner and outer member. This difficulty I overcome by my improved method, and am enabled by said method to commercially form compound receptacles having a uniform and satisfactory bonded connection between the inner and outer members.

While, in the description, I have referred to a receptacle composed of two members, and a receptacle where the inner member is composed of tin or lead, and the outer member composed of steel, such reference is for purposes of illustration, and I do not wish to be understood as limiting my invention to that scope.

1 represents a cylindrical member, closed at its lower end and open at its upper end. This member may be composed of steel, or any other desired material.

2 represents a coating of solder, applied by any desired flux, coating the inner surface of the outer member 1.

3 represents what I term the "inner member", which may be composed of lead or zinc, and is provided on its outer surface with a coating 4, of a suitable solder. The members so prepared are nested one within the other, as in Fig. 4, with the coating 2 in engagement with the coating 4. Thereafter, when the walls of the member 1 are sufficiently strong to withstand the strain, a cap 10 is secured in any desired way to the top of the member 3, a pipe 11 leading from said cap to any suitable air-pressure supply, and the parts are secured in any suitable frame or device while under pressure. In cases where the material of the member 1 is not sufficiently strong to withstand the pressure, the members nested, as shown in Fig. 4, may themselves be placed in any suitable chamber constructed to hold the members and maintain them in place during the subsequent operations. In that case, after the parts are assembled, as shown in Fig. 4, heat is then applied sufficiently to soften the coating, and when the inner member is composed of tin or lead, these are also more or less influenced by the heat. The pressure is first applied in order to force the coated wall of the member 3 against the complemental wall of the member 1 evenly. After this is done heat is applied until the required union between the two walls is secured. In most cases, I have found where I employ steel for the outer member and tin or lead for the inner member, a pressure of one hundred pounds to the square inch will accomplish the desired result, but this pressure may be varied, depending upon the conditions attending the particular piece of work. By this method, the inner member is forced against the outer member uniformly at all points, and this pressure can be maintained during the softening of the coating, and continued until after the parts have united and cooled, thereby effecting a uniform and permanent union between the inner and outer member.

It is to be understood that the drawings exaggerate the thickness of the lining 2 and coating 4, in order that the presence thereof will be perceptible to the eye in the sectional views.

Where in the specification and claims I have referred to coating of the two parts to be united, I wish to be understood as referring to a coating as distinguished from a lining, so called. Said coating should be as thin as possible, and a convenient method of applying said coating is by the so-called dry tin method, that is to say, the coating is applied to the particular surface and then "wiped", so called, to strip from said surface any surplus material. While in the specification

and claims I have referred to a receptacle, I do not wish to be understood as limiting my invention and claims to a dish, for instance, as my invention is equally applicable, and designed by me to embrace any inclosing structure, whether closed at one end, as a dish, or tank, or open at both ends, as a pipe, and by the word "receptacle" I desire and intend to embrace and cover the said structure and also analogous classes of structures.

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be used, or all of the modes of its use, what I claim and desire to secure by Letters Patent is:—

1. The method of applying a lining to a receptacle, which consists in coating the outer surface of the lining and the inner surface of the receptacle with a suitable solder, nesting said members one within the other, and with their complemental surfaces in contact, thereafter applying air pressure to force the walls of the inner member against those of the outer member, and then subjecting the parts to the action of heat to unite the complemental walls of said members.

2. The method of applying a lining to a metallic surface which consists in previously coating the opposing faces of said surface and lining with a suitable solder, placing said coated faces in contact and applying air pressure to said parts, and thereafter subjecting said parts to heat to unite the lining and surface.

In testimony whereof I have affixed my signature, in presence of two witnesses.

ARTHUR C. BADGER.

Witnesses:

E. BATCHELDER,

ARTHUR H. BROWN.