P. SCHICKERT.

METHOD OF SECURING THIN WALLED HOLLOW BODIES TO METAL PLATES.

APPLICATION FILED MAR. 7, 1911.

1,010,960. Patented Dec. 5, 1911.

Fig. 1.

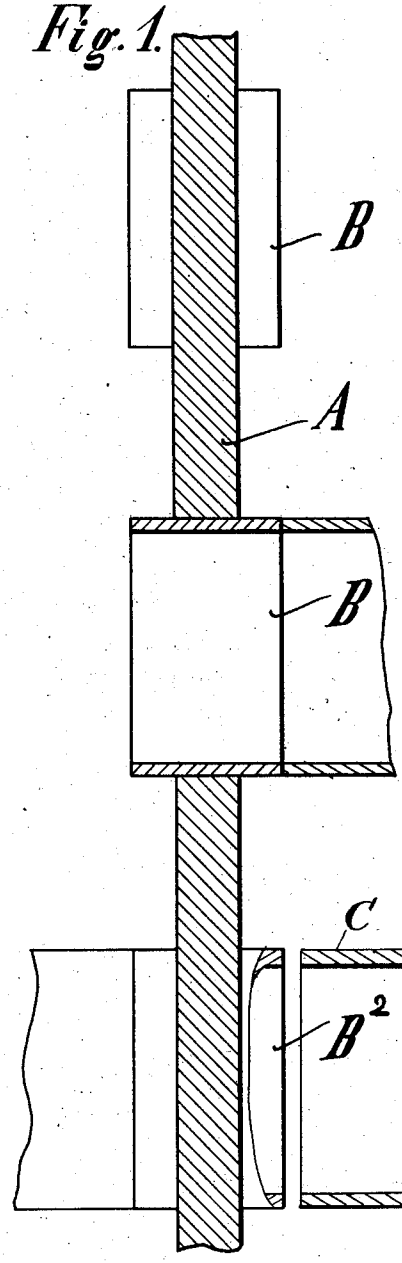
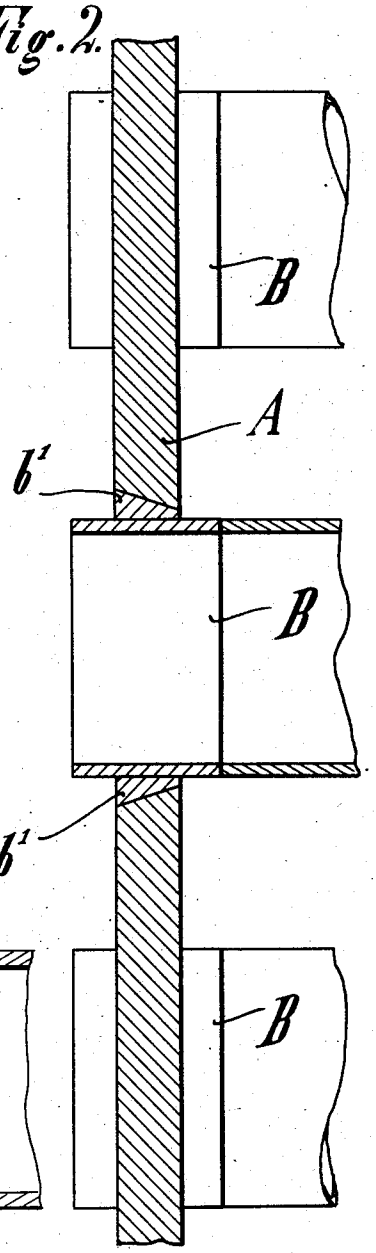


Fig. 2.



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METHOD OF SECURING THIN-WALLED HOLLOW BODIES TO METAL PLATES.

1,010,960. Specification of Letters Patent. Patented Dec. 5, 1911.

Application filed March 7, 1911. Serial No. 612,787.

To all whom it may concern:

Be it known that I, PAUL SCHICKERT, a subject of the Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in the Method of Securing Thin-Walled Hollow Bodies to Metal Plates, of which the following is a specification.

This invention relates to the method of securing thin walled hollow bodies to metal plates, by first providing the metal plate with an annular attachment, the thickness of whose walls corresponds as nearly as possible to that of the thin walled hollow body, after which the thin walled hollow body is connected with the attachment by welding. In the use of this process, difficulties are encountered when one of the two bodies to be connected together, (the metal plate or the thin walled hollow body) or both of them consist of a material which immediately begins to pass from the rigid to the fluid state, under the heat required for the process, as for example, when it is proposed to secure iron pipes to copper plates. If the annular attachment in such plates, to which the hollow body is to be connected, consists of the same material as the plate, for example copper, the welding of the hollow body is only attained when the plate lies horizontal, whereas with another position, the material of the annular attachment, which is already thinly fluid at the welding temperature of the iron, would uselessly flow away. But in many cases, for example, when the metallic plate constitutes the tube-wall of a steam boiler, it is very inconvenient, if not altogether impossible, to bring the metal plate into a horizontal position.

The invention has for its purpose to employ the steps in the process referred to without necessitating the bringing of the plate into a horizontal position, and also to adapt the process for use in those cases where at least one of the two bodies to be connected, consists of a material which, at the temperature required, begins to pass from the rigid to the fluid state.

The purposes are attained, according to the invention, by providing an attachment on that one of the bodies which consists of the metal referred to, which attachment consists of a material that can assume a plastic property and then connecting this attachment with the intended body, by a metallic fusion.

Several illustrative examples of the process constituting the subject matter of the invention are hereinafter explained, with reference to the accompanying drawing, in which,

Figures 1 and 2, each illustrate a section of a metallic plate to which a hollow body is to be connected, and to which the attachments of special metal have been applied.

In Figs. 1 and 2 of the drawing, it is assumed that iron boiler tubes are to be secured to the tube wall of a copper locomotive fire-box. In such cases, short iron bushings B are introduced into the bores of the tube wall A and connected with the same by means of autogenous fusion in order to provide the annular attachments to which the iron boiler tubes (not shown in the drawing) are to be secured. The connection of the bushings B with the plate A has already been accomplished in the production of the fire-box, before the tube-wall is riveted to the adjacent walls of the fire-box. Since it is still quite easy to lay the tube wall horizontal, the connections between the bushings B and the plate can be produced without difficulty, in the manner already given. The tube-wall A will be suitably heated over a grate fire in order to avoid undesirable conducting away of the heat through the relatively large mass of the copper plate. In Fig. 1, it is assumed that the bushings B are to be connected immediately with the tube-wall A. The production of the connection between the bushings B and the tube-wall A will be facilitated, if before introducing the bushing into the tube-wall, the bushing, as shown in Fig. 2, is provided, in any suitable manner, with a sleeve b^1 of sufficient thickness, which likewise consists of copper. In this case, the union by the autogenous fusion takes place between the copper of the sleeve b^1 and the copper of the tube wall A.

Instead of autogenous fusion, brazing may be employed for securing the iron bushings to the tube-wall.

After the fire-box is erected in the boiler, the boiler tubes are welded to the bushings B. Since iron attains a plastic condition at the welding temperature and therefore does not run, the welding of the boiler tubes can

take place as well with the tube-wall standing upright. In doing this, it is not necessary (as with the above described fixing of the bushings B) to heat the entire tube-wall for the purpose of preventing an unfavorable loss of heat by conduction. This is an important advantage because the heating of the tube-wall has an unfavorable influence upon the rivet connections.

If not only the tube-wall but also the tubes consist of a material which, at the required temperature for welding, begins to change immediately from the rigid to the fluid state, the process is suitably carried on in such a manner that the tubes D are provided with extension pieces C which, like the annular attachments B^2 of the tube-wall, are produced from a material which can assume a plastic property, after which these extension pieces C are welded to the attachment B^2. When copper tubes having iron extension pieces are to be dealt with, the connection of the extension pieces with the tubes can be made by hard soldering or brazing.

I claim:—

1. The process of securing a thin walled hollow body with a body in the form of a metal plate when one or the other of said bodies is constructed of metal which begins to flow under a welding heat, which consists in first combining with said last named body, an annular member constructed of a material which retains its form under the welding heat and then welding on the other of the two bodies to be connected.

2. The process of securing together a thin walled hollow body and a metal body in the form of a plate constructed of a material which begins to flow under a welding heat, which consists in first uniting with the plate an attachment having a thickness of wall corresponding substantially to that of the thin walled hollow body and of a material which retains its form under the welding heat and then welding the thin walled hollow body to said attachment.

3. The process of securing together a thin walled hollow body and a metallic plate constructed of a metal which begins to flow under a welding heat, which consists in introducing a bushing into the plate, having a thickness of wall corresponding substantially to that of the thin walled hollow body to be attached, suitably uniting the bushing to the plate and then welding on the thin walled hollow body.

4. The process of attaching thin walled hollow bodies to plates constructed of a metal which begins to flow under a welding heat, which consists in uniting with the plate, by autogenous fusing, accompanied by simultaneous heating of the plate, a bushing substantially corresponding in thickness to that of the thin walled hollow body to be attached and then welding together the thin walled hollow body and said bushing.

5. The process of securing thin walled hollow bodies to plates constructed of a metal which begins to flow under a welding heat, which consists in providing a bushing corresponding in thickness substantially to that of the thin walled hollow body to be attached; applying a sleeve to the bushing; introducing the sleeve into an aperture of the plate and welding it thereto and then welding the thin walled hollow body to the bushing.

6. The process of securing thin walled hollow bodies to metallic plates constructed of metal that begins to flow under a welding heat, which consists in providing a bushing having a thickness of wall corresponding substantially to that of the thin walled hollow body to be attached and of a metal which becomes plastic under the welding heat; brazing upon said bushing a sleeve constructed of a metal adapted to be fused with the metal of the plate; fitting the sleeve in an aperture of the plate; fusing together the sleeve and the plate; and thereafter welding to the bushing thus secured, the thin walled hollow body to be attached.

7. The process of attaching together a thin walled hollow body and a body in the form of a plate when both of said bodies are of metal which begins to flow under a welding heat; which consists in uniting with each of said bodies a thin walled extension constructed of a metal which retains its form under the welding heat and then welding together the said thin walled extensions.

The foregoing specification signed at Barmen, Germany, this 14th day of February, 1911.

PAUL SCHICKERT. [L. S.]

In presence of—

CHAS. J. WRIGHT,

ALFRED HENKEL.