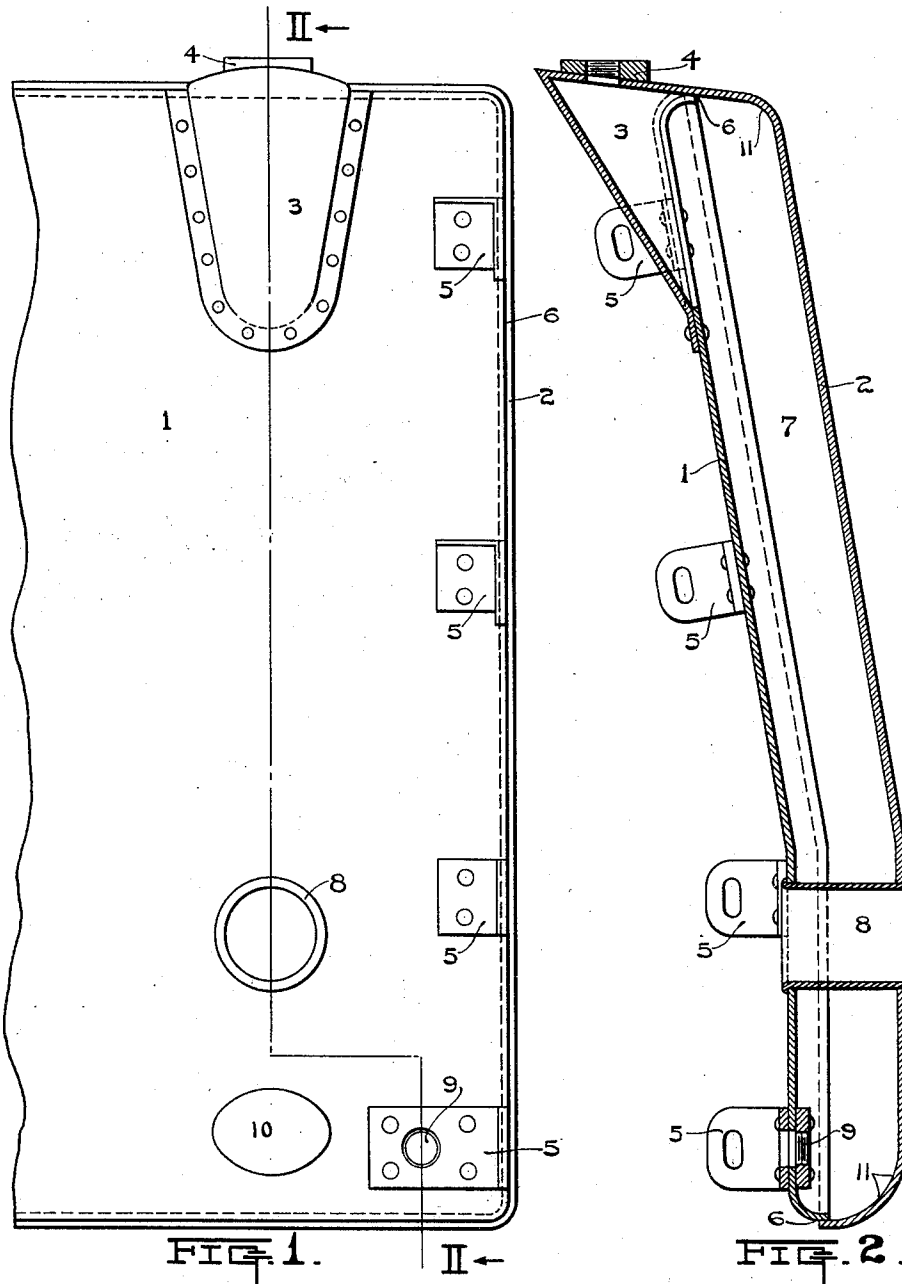


H. C. HOLTHOFF.
WATER JACKET.
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1,047,055.

Patented Dec. 10, 1912.



WITNESSES —
W. H. Lieber
Ella Brickell

H. C. Holthoff INVENTOR—
BY *J. J. Wein* ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY C. HOLTHOFF, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW JERSEY.

WATER-JACKET.

1,047,055.

Specification of Letters Patent.

Patented Dec. 10, 1912.

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To all whom it may concern:

Be it known that I, HENRY C. HOLTHOFF, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a certain new and useful Improvement in Water-Jackets, of which the following is a specification.

This invention relates to improvements in the construction of sheet metal water jackets such as are used in jacketing smelting or blast furnaces.

The object of the invention is to provide a sheet metal water jacket for furnaces, which is simple, durable and cheaply manufactured.

In sheet metal jackets as heretofore constructed, great difficulty has been encountered in maintaining a water tight joint between the fire sheet and the outside sheet of the jacket. Such leakage at the joint between these two sheets has almost invariably been caused by the unequal expansion and contraction of the sheets, with no provision having been made to prevent excessive strains resulting from such unequal expansion and contraction from falling on the joint between the two sheets. With the construction disclosed in the present invention the inequality in expansion or contraction of the sheets does not tend to rupture the joint.

A clear conception of one embodiment of the invention can be obtained by referring to the accompanying drawing in which like reference characters designate the same or similar parts in the different views.

Figure 1 is a fragmentary elevation of a furnace water jacket, looking toward the back or outside sheet thereof. Fig. 2 is a transverse vertical section through the jacket shown in Fig. 1, the section being taken along the line II—II of Fig. 1, looking in the direction of the arrows.

The furnace jacket consists essentially of an inside or fire sheet 2 and an outside or back sheet 1. The fire sheet 2 has its edges turned outwardly, giving the sheet the effect of being pan shaped. The outside sheet 1 has its edges turned inwardly, the outer periphery of the up-turned edges of the sheet 1 being slightly less than the inner periphery of the up-turned edges of sheet 2. The corners 11 at the junction of the up-turned edge portions with the sheets 1, 2,

are given as large a radius of curvature as possible. The outside sheet 1 coacts with the fire sheet 2 along the surface 6, the two sheets being fastened to each other either by welding, pressing, riveting, or other suitable means.

The outside sheet 1 is provided with suitable water inlets 9 near the bottom thereof, and outlets 3 near the upper end thereof. The outlets 3 communicate with suitable pipes, not shown, which have screw thread coaction with the flanges 4 fixed to the upper end of the fire sheet 2. Flanges 5 at either end of the outside sheet 1 provide means for securing adjacent jackets to each other. Handholes 10 provided at the lower portion of the outside sheet 1 permit the removal of foreign matter from the interior of the jacket.

The twyers 8 span the interior chamber of the jacket and connect the fire sheet 2 with the outside sheet 1. The connection between the twyers 8 and the sheets of the jacket can be made either by spinning the twyers into place or by welding the joints between the twyer and jacket sheets 1 and 2. In constructing the water jackets, the fire sheet 2 and outside sheet 1 are formed from flat plates, the flanging thereof being accomplished by heating the plate. As heretofore explained, the outer periphery of the outside sheet 1 coacts with the inner periphery of the fire sheet 2 along the surface 6. The joints between the sheets 1, 2, are preferably welded, but may be riveted or otherwise formed as desired.

The fire sheet 2 during the installation of the jacket in a furnace is subjected directly to the intense furnace temperature. The melting or burning of this sheet 2 is, however, prevented by a constant circulation of water entering the jacket through the inlets 9 and escaping therefrom through the outlets 3. The intensity of the temperature within the furnace is augmented by the admission of air through the twyer 8. It will be seen that as the fire sheet 2 is subjected to an intense temperature the ideal conditions would be to have the outside sheet 1 subjected to the same temperature in order to have equal or nearly equal expansion in both of these sheets. This, however, is impossible and proper provision to take up the unequal expansion of the two

1 sheets is made by forming the curves 11 of
 2 large radius at the corners of the sheets 1,
 2. The curves at the corners of the outside
 sheet 1 are not as great as the curves 11 of
 5 the fire sheet 2 since the comparatively shall-
 low flange of this sheet will not permit the
 use of as large a radius of curvature as that
 of the fire sheet 2. In any event, the radius
 of curvature of flange of the sheets should
 10 be substantially equal to the depth of the
 pan formed.

15 With the formation of large radii of curva-
 ture at the corners of the sheets, it will be
 noted that as the fire sheet 2 becomes heated
 and expands, the outside sheet meanwhile
 remaining at comparatively constant tem-
 perature, such expansion will be taken up
 in the curves at the corners of the two
 sheets.

20 In cases where the fire sheet 2 alone is
 flanged, the outside sheet 1 being a flat
 plate, the expansion of the fire sheet 2 must
 be taken up in the curves at the corners of
 the inside sheet entirely. This is, however,
 25 impossible since the expansion in the fire
 sheet is often considerable and it has been
 found in the actual construction of these
 jackets that such expansion of the fire sheets

2 invariably causes a rupture of the joint be-
 tween the two sheets.

30 It should be understood that it is not de-
 sired to be limited to the exact details of
 construction shown and described, for ob-
 vious modifications will occur to a person
 skilled in the art.

35 It is claimed and desired to secure by
 Letters Patent,—

1. In a furnace jacket, a fire sheet, and
 an outside sheet spaced from said fire sheet,
 the corresponding peripheral edges of said 40
 sheets being gradually inwardly directed
 toward each other and united to form an in-
 closed chamber between said sheets.

2. In a furnace jacket, a fire sheet, and an
 outside sheet spaced from said fire sheet, the 45
 corresponding peripheral edges of said sheets
 being gradually inwardly directed toward
 each other and welded together to form an
 inclosed chamber between said sheets.

In testimony whereof, I affix my signature 50
 in the presence of two witnesses.

HENRY C. HOLTHOFF.

Witnesses:

CHAS. L. BYRON,
 W. H. LIEBER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
 Washington, D. C."