No. 807,076. PATENTED DEC. 12, 1905.

C. W. HAWKES.

WATER JACKET.

APPLICATION FILED NOV. 18, 1904.

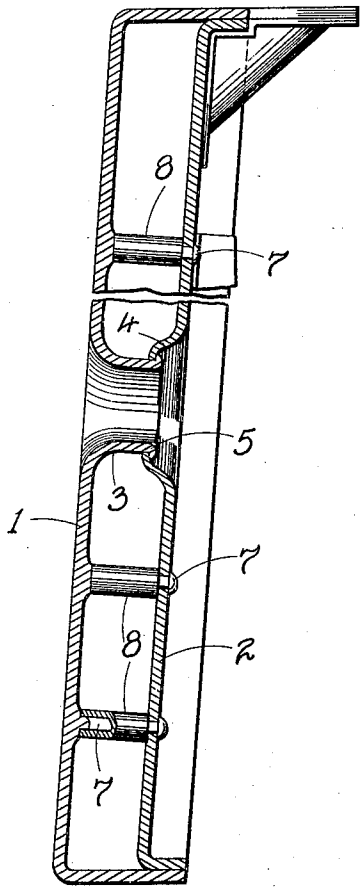


FIG. 1.

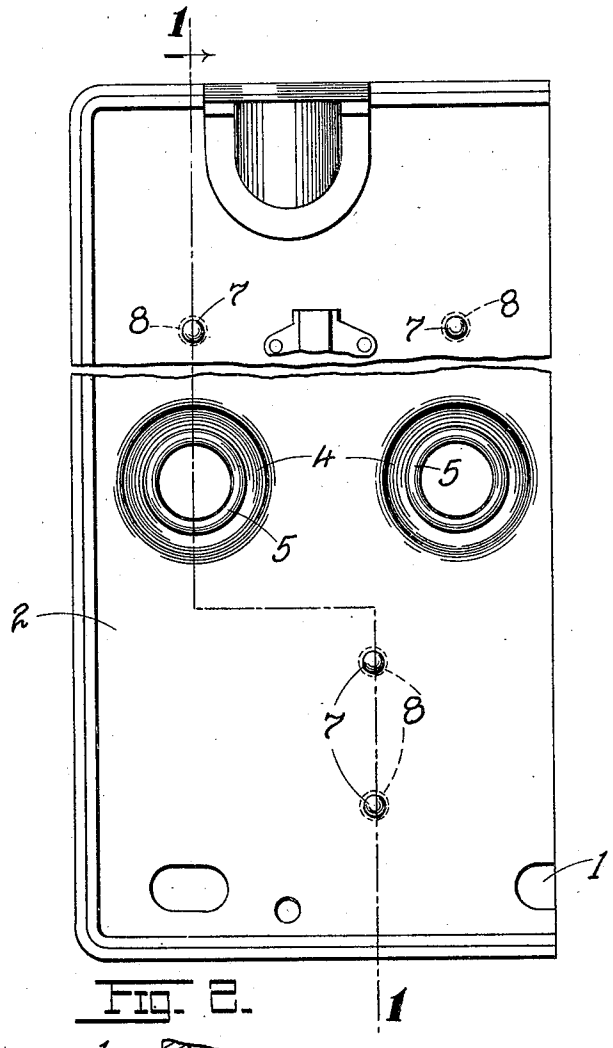


FIG. 2.

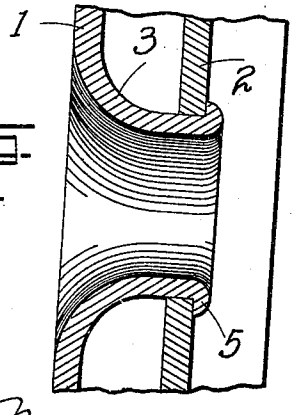


FIG. 3.

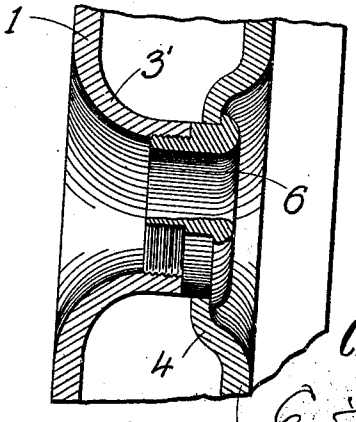


FIG. 4.

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WATER-JACKET.

No. 807,076. Specification of Letters Patent. Patented Dec. 12, 1905.

Application filed November 18, 1904. Serial No. 233,301.

To all whom it may concern:

Be it known that I, CHARLES W. HAWKES, a citizen of the United States, residing at Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Water-Jackets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in water-jackets for cupola, blast, and similar furnaces; and it consists in the novel construction of jacket more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a longitudinal vertical section on the line 1 1 of Fig. 2. Fig. 2 is an elevation of one-half of the jacket broken above the twyers. Fig. 3 is a sectional detail of a twyer-opening of a shallow jacket, and Fig. 4 is a sectional detail showing a screw-threaded ring for the nipple of the twyer-opening of the inner sheet.

The object of my invention is to construct a water-jacket in which the element of leakage at the twyers shall be eliminated, the invention dispensing with the necessity of the prevailing twyer-block generally interposed between the inside and outside sheets and which is secured to the respective sheets by rivets passing through the walls of the block and sheets, respectively, the inner ends of the rivets being directly exposed to the charge of the furnace.

A further object is to produce an economical, cheap, and durable construction, all as will more fully appear from a detailed description of the invention, which is as follows:

Referring to the drawings, and particularly to Figs. 1 to 3, inclusive, 1 represents the inside sheet, and 2 the outside sheet, of the water-jacket. At points where it is desirable to locate a twyer the inside sheet is punched and flanged outwardly—that is, toward the outside sheet—there being thus formed an opening bounded by the inwardly-flaring nipple 3. Opposite the nipple 3 of the inside sheet the outside sheet has punched and flanged inwardly therefrom an outwardly-flaring nipple 4 of compound curvature, the opening of said nipple 4 receiving the adjacent end of the nipple 3 and forming a tight joint therewith, the edge of the metal of the nipple 3 being subsequently expanded against the outer face of the end of the nipple 4, thereby forming an expanded ring or bead 5, which insures an absolutely water-tight joint between the nipples. The nipple 4 is resorted to as a constructive feature in jackets of maximum depth—say where the distance between the inside and outside sheets equals or exceeds four inches—for it would be ordinarily impractical in such cases to carry the nipple 3 of the inside sheet the full distance of the space separating the sheets, the thinness of the metal not warranting such undue expansion; but for jackets of moderate depth the edge or end of the nipple 3 of the inside sheet is passed through an opening formed in the original wall of the outside sheet, as shown in Fig. 3, the end of said nipple 3 being expanded against the outer face of the outside sheet, as in the forms shown in Figs. 1 and 2. By this species of twyer formation—that is to say, a twyer integrally connected at its base to the sheet of which it forms a part—the use of rivets is entirely avoided, so that the starting of a leak is practically impossible, there being no rivet-heads exposed either to the charge in the furnace or to the water in the jacket.

Should the nipple 3 in time deteriorate and weaken, I may repair the same by removing the outer portion thereof, cut a thread on the interior, and screw in an extension ring or thimble 6 to the required depth, the outer end of the ring being in like manner expanded over the edge of the opening and against the face of the outside sheet. This construction (resulting in the formation of two sections for the nipple) is shown in Fig. 4, where 3′ represents the base of such sectional nipple or so much of the original nipple 3 left intact. In either case, however, whether it is the nipple 3 or the portion 3′ with its repair-ring 6, the nipple as a whole has its base formed integrally with the inside sheet, the end of the nipple being secured to the outside sheet, the manner of securing the same being preferably by expanding it against the outside sheet, as shown in the drawings.

The inside sheet is preferably provided with stay-bolts 7 welded thereto, the outer ends of the bolts being preferably passed through the outside sheet and riveted thereto, a suitable spacing-thimble 8 being previously passed over the bolt. These features, however, I do not claim herein, forming, as they do, the subject-matter of a divisional application.

It is of course apparent that the nipple 3 (or 4) need not necessarily flare toward its

sheet, as shown, any nipple having the characteristics here outlined falling within the spirit of my invention.

Having described my invention, what I claim is—

1. A water-jacket comprising an inside and an outside sheet, and having twyer-openings formed in the respective sheets, a nipple bounding the opening of the inside sheet and integrally united at its base with said sheet, the outer end of the nipple being passed through the opening of the outside sheet and expanded against the face thereof, substantially as set forth.

2. A water-jacket comprising an inside and an outside sheet, and having twyer-openings formed in the respective sheets, an inwardly-flaring nipple bounding the opening of the inside sheet and forming an integral part of said sheet, the end of the nipple being passed through the opening of the outside sheet and expanded against the face thereof, substantially as set forth.

3. A water-jacket comprising an inside and an outside sheet, and having twyer-openings formed in the respective sheets, an inwardly-flaring nipple bounding the opening of the inside sheet, an outwardly-flaring nipple bounding the opening of the outside sheet, the end of the inner nipple being passed through the end of the outer nipple and expanded against the outer face of the latter, substantially as set forth.

4. A water-jacket comprising an inside and an outside sheet, and having twyer-openings formed in the respective sheets, an inwardly-flaring nipple bounding the opening of the inside sheet, an outwardly-flaring nipple of compound curvature bounding the opening of the outside sheet, the inner edge of the outer nipple snugly embracing the peripheral wall of the inner nipple and making a tight joint therewith, and the end of the inner nipple being expanded against the outer face of the outer nipple, substantially as set forth.

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

CHARLES W. HAWKES.

Witnesses:
EMIL STAREK,
M. B. BELT.