

No. 815,013.

PATENTED MAR. 13, 1906.

C. W. HAWKES.  
WATER JACKET.

APPLICATION FILED FEB. 11, 1905.

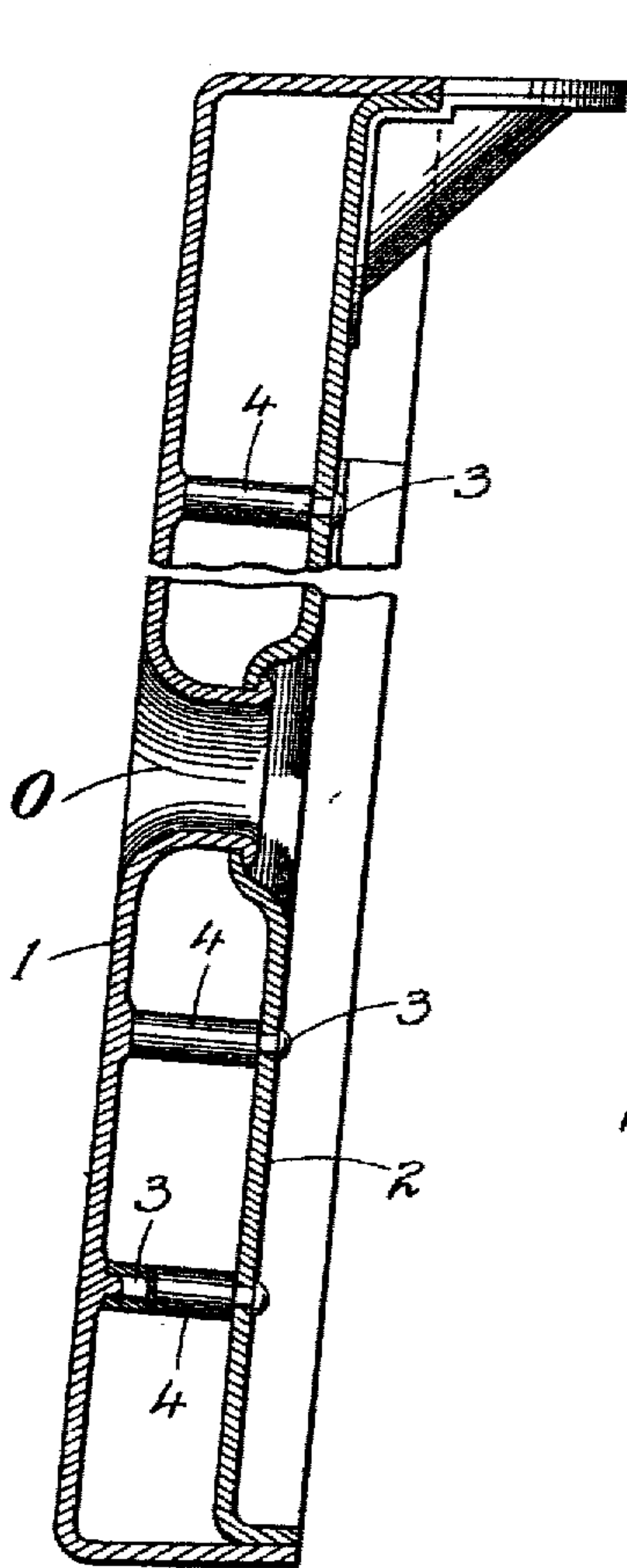


FIG. 1.

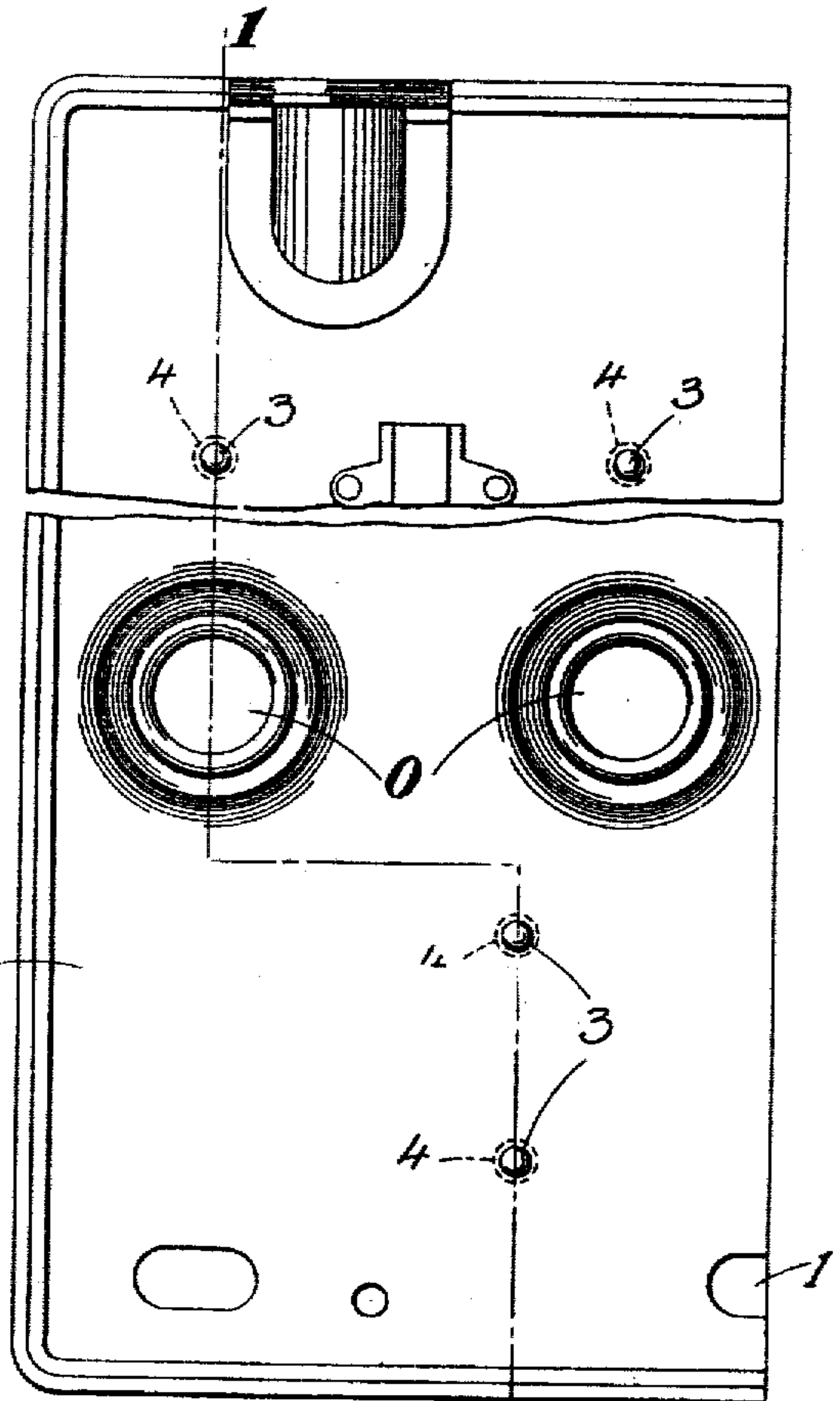


FIG. 2.

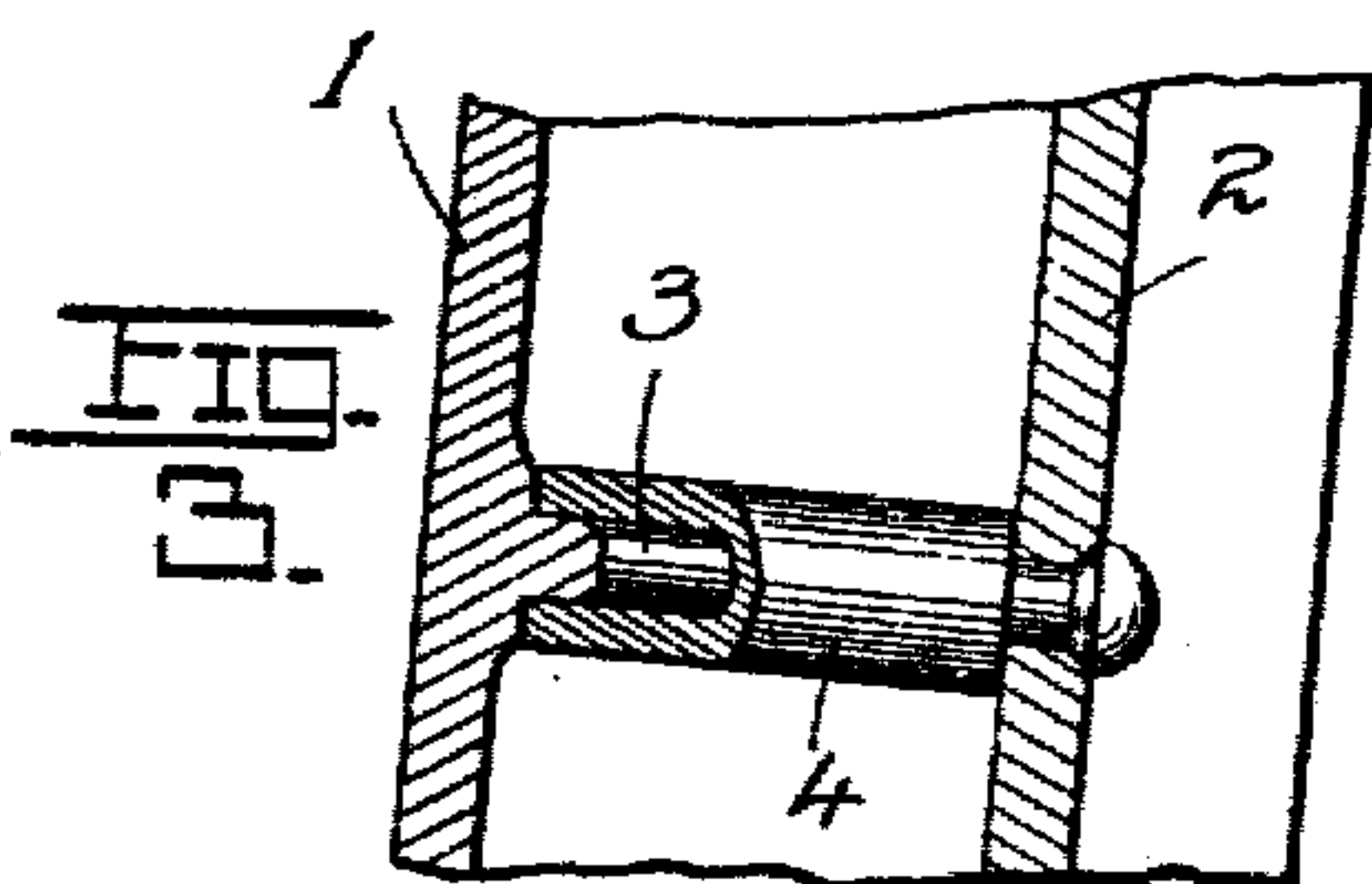


FIG. 3.

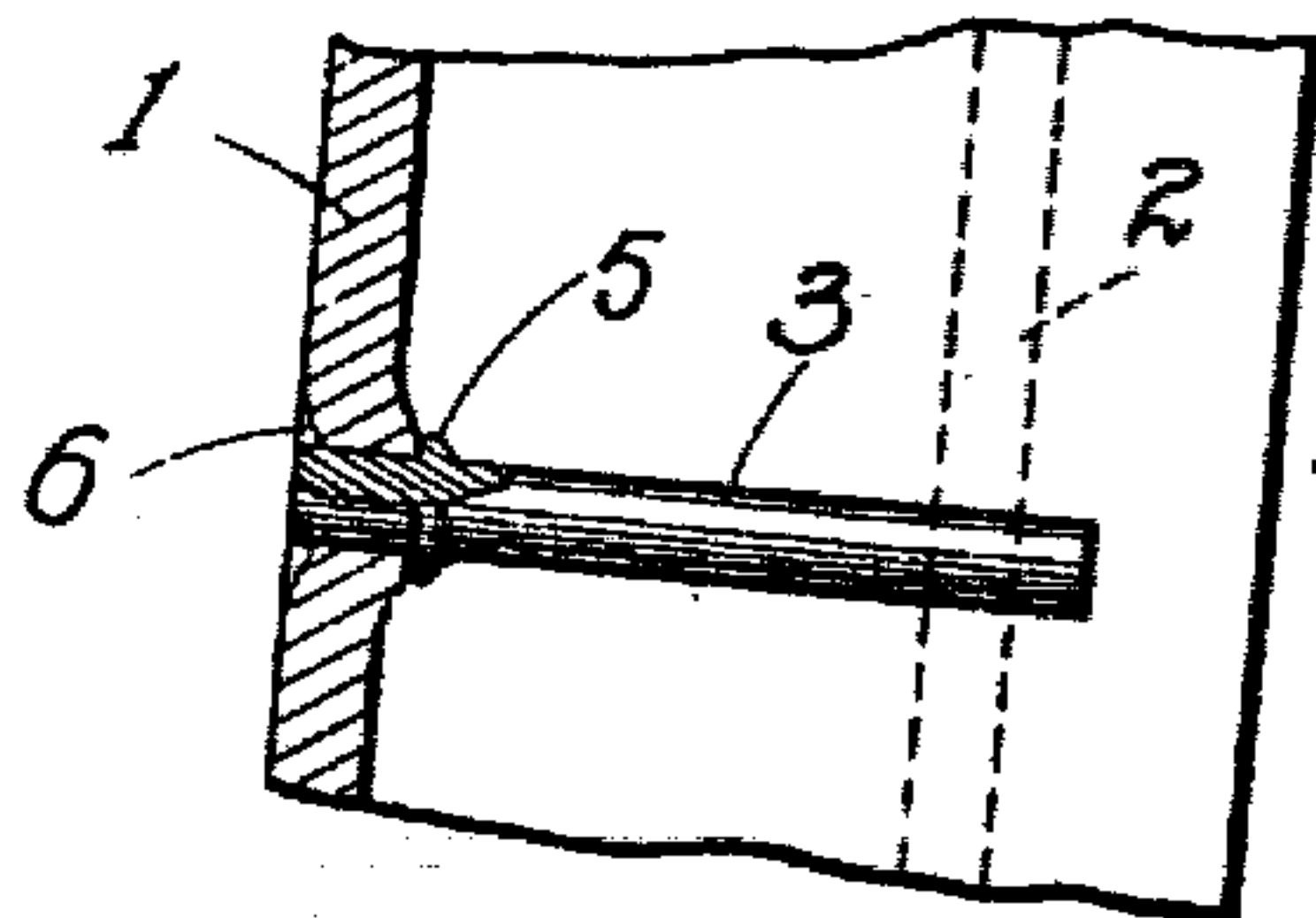


FIG. 4.

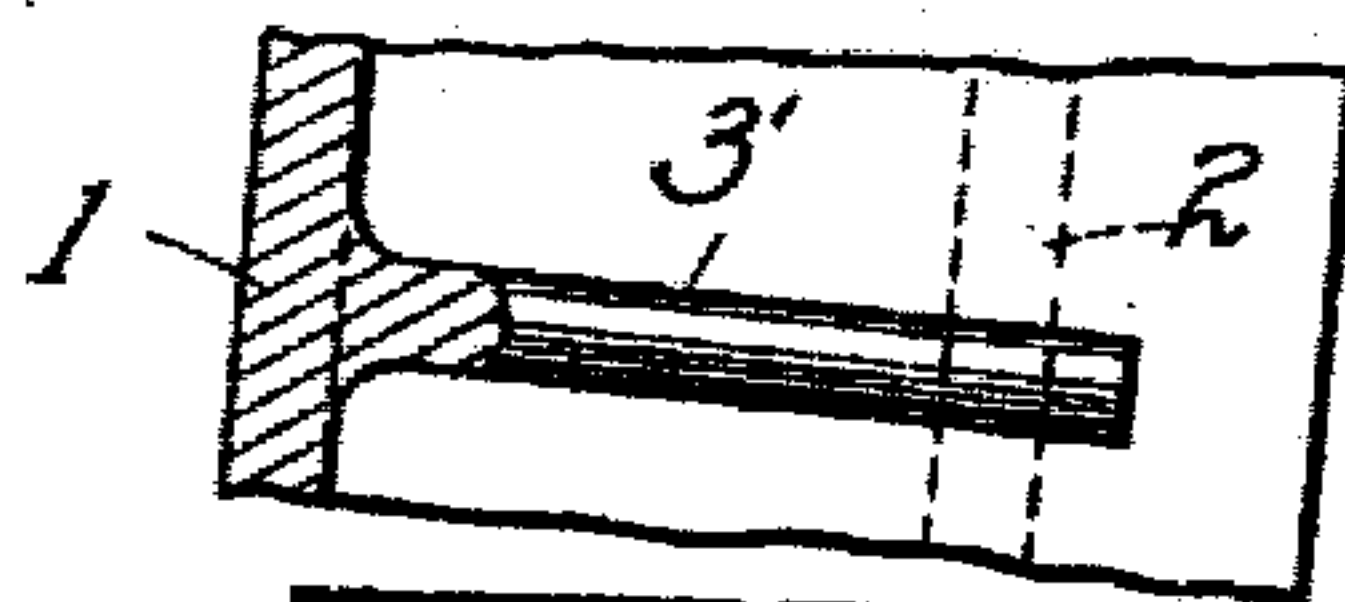


FIG. 5.

Witness  
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# UNITED STATES PATENT OFFICE.

CHARLES WILLIAM HAWKES, OF SPRINGFIELD, ILLINOIS.

## WATER-JACKET.

No. 815,013.

Specification of Letters Patent.

Patented March 13, 1906.

Original application filed November 18, 1904, Serial No. 233,301. Divided and this application filed February 11, 1905. Serial No. 245,288.

*To all whom it may concern:*

Be it known that I, CHARLES WILLIAM 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 section on the line 1 1 of Fig. 2. Fig. 2 is an elevation of one-half of the jacket broken above the tuyers. Fig. 3 is a sectional detail showing the main form of welded stay-bolt. Fig. 4 is a sectional view showing the application of a stay-bolt to the inside sheet under one process of welding, and Fig. 5 is a sectional detail showing a stay-bolt attached to the inside sheet under a modified process of welding.

The present application is a division of my pending application on water-jackets originally filed under date of November 18, 1904, Serial No. 233,301, being restricted to those features in the original which were directed to the mechanical details entering into the construction of the inside and outside sheets of the jacket.

The object of the invention is to construct a water-jacket in which the element of leakage and consequent delay resulting therefrom shall be wholly eliminated, the inner wall of the jacket presenting an uninterrupted, unbroken, and seamless surface to the ore charge, so that the starting of a leak is impossible.

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, 1 represents the inside sheet, and 2 the outside sheet, of the water-jacket. In the present invention I eliminate any and all rivet-heads from the inside sheet. This I accomplish by welding to the inside sheet what constitutes stay-bolts in the prevailing forms of construction. Such welded stay-bolts are represented by

the reference-numeral 3 in the drawings. The outer ends of said welded bolts are passed through the outside sheet and preferably riveted thereto, a suitable spacing piece or thimble 4 being previously passed over the bolt. The manner of welding the stay-bolt to the inside sheet is illustrated in Fig. 4. The sheet is first punched with a hole sufficient to receive the end of the stay-bolt, the latter being limited by an annular shoulder 5. When the parts are thoroughly welded, the head of the bolt is expanded into the depression 6, resulting from the formation of the hole, and the metal of the shoulder 5 disappears in or merges with that of the sheet, and we have a final construction, as shown in Fig. 3, the bolt being for all intents and purposes an integral part of the sheet.

Another method of welding (that by electricity) is illustrated in Fig. 5, where the bolt 3' is placed squarely against the original sheet along an original line of demarcation, (shown by the dotted line in said figure,) when upon the conclusion of the welding operation the bolt becomes an integral part of the inside sheet. The welding of the stay-bolts to the inside sheet leaves the inner surface of the latter—that is, the surface exposed to the charge—smooth, uninterrupted, and seamless, so that the danger of leakage is entirely eliminated. Thus the present jacket in no wise presents any rivet-heads to either the charge in the furnace or to the water in the jacket, and leakage is practically impossible. The consequence is a prolonged life for the jacket and economy in the operating expenses of the furnace, since repairs are seldom necessary while the furnace is in operation.

I may of course depart from the details of construction here shown without in any wise affecting the nature or spirit of my invention. These details have reference more particularly to the connections between the welded bolts and the outside sheet, and while in the present case the outer ends of the bolts are shown as passing through the outside sheet and riveted thereto it is apparent that they need not necessarily pass there-through, but may engage said sheet from the inside. Neither do I limit myself to any particular configuration for such stay-bolt, any equivalent formation falling within the spirit of my invention. The details of the con-



struction of the twyer O are not herein referred to, as they form the subject-matter of the pending application aforesaid.

While the invention is herein specifically  
5 directed to water-jackets for furnaces, it is to be understood that in its application it is not restricted thereto, but may be used in boiler and other constructions as well, the invention in its broad contemplation covering  
10 a structural member or sheet having bolts welded thereto or otherwise formed integrally therewith.

Having described my invention, what I claim is—

15 1. A water-jacket comprising an inside and an outside sheet, a series of stay-bolts having

one of their ends welded to the inside sheet, and their opposite ends passed through and riveted on the outside to the outside sheet, substantially as set forth.

20

2. A water-jacket comprising an inside and an outside sheet, a series of stay-bolts welded to the inside sheet and having their free ends passed through and riveted to the outside sheet, substantially as set forth.

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

CHARLES WILLIAM HAWKES.

Witnesses:

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GEO. M. SWITZER.