No. 860,008. PATENTED JULY 16, 1907.

# H. AUERBACH.

## BOILER TUBE JOINT.

APPLICATION FILED OCT. 25, 1906.

Fig. 1.

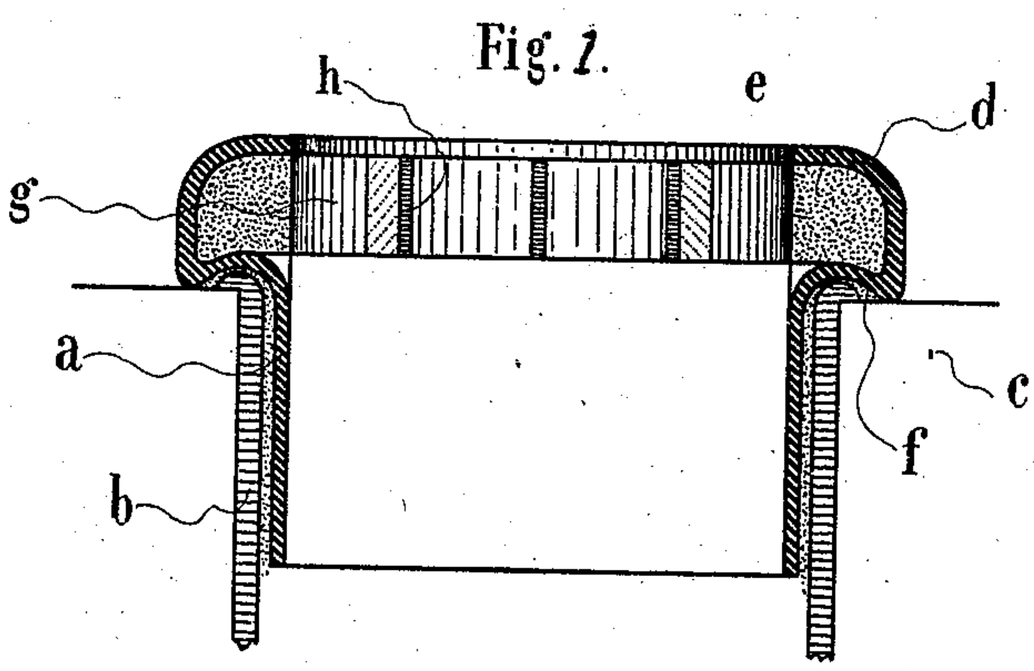
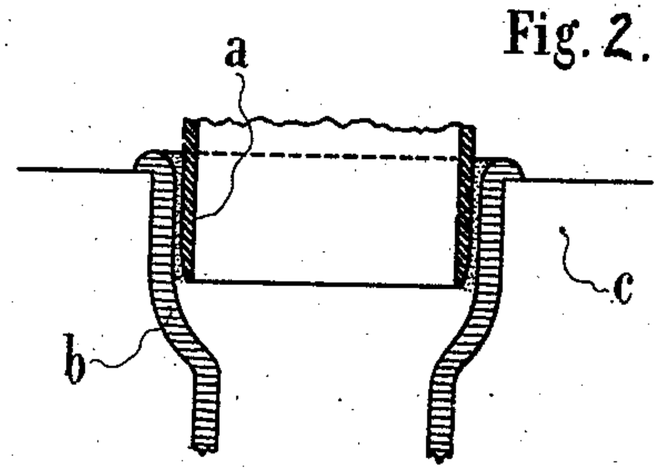



Fig. 2.




Witnesses

C. E. Jones

Geo. H. Luscombe

Inventor

Hans Auerbach

by S. Brashears

Asso. Attorney

# UNITED STATES PATENT OFFICE.

HANS AUERBACH, OF DRESDEN, GERMANY.

## BOILER-TUBE JOINT.

No. 860,008. Specification of Letters Patent. Patented July 16, 1907.

Application filed October 25, 1906. Serial No. 340,558.

*To all whom it may concern:*

Be it known that I, HANS AUERBACH, a subject of the German Emperor, residing at Dresden, Germany, have invented new and useful Improvements in Boiler-Tube Joints, of which the following is a specification.

The present invention has reference to that class of devices designed to prevent the flame tubes of locomotive, marine and like boilers from working loose in the tube sheets. This working loose, as is well known, takes place at the joint between tube and tube-sheet and is occasioned by the "working" of the tube end caused by the contraction and expansion of the metal parts under the varying degrees of temperature to which they are subjected.

My invention provides means for protecting the joint and is illustrated, by way of example, in the accompanying drawing, in which

Figure 1 is a sectional view on a plane passing through the longitudinal axis of a tube equipped with my invention, and Fig. 2 is a similar sectional view of enough of a modification of the construction of Fig. 1 to show the application of invention to a tube having its end expanded.

Referring to Fig. 1, the protecting device essentially consists of a cylindrical collar *a* of any suitable apyrous material, such as metal, clay, chamotte or the like, of a diameter to easily fit into the boiler tube *b* at the joint with the tube-sheet *c*. The outer producing rim or lip *d* is somewhat thickened and provided with an annular recess *f*, extending over and thereby protecting the circular joint. The collar is secured in the tube by means of suitable binding material, such as cement, concrete and the like, and the inner surface of the collar may also be covered with an apyrous material. The thickened lip *d* is hollowed out as at *g* and partitions *h* are provided, thus forming chambers or recesses in which the cement or the like is the better retained.

It is undesirable to decrease the inner diameter of the boiler tube, and the end may be expanded as shown in Fig. 4. This form is especially designed for new boilers where the tube may be made of any desired form, but with old boilers the existing form must be retained. The joints between tube and boiler wall being thus protected against the flame by these collars, the "working" of the tube ends will be greatly lessened and the life of the boiler considerably lengthened.

What I claim as new is:—

The combination with a tube-sheet of a boiler provided with an opening to receive the tube end, of a tube secured in said opening, a collar of heat-resisting material fitted into the end of the tube and provided with a hollow lip of greater diameter projecting over the joint on the outside of the tube sheet having radial partitions forming cells, cementitious material in said cells, and similar material between the tube and collar, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HANS AUERBACH.

Witnesses:

ULYSSES J. BYWATER,

PAUL ARRAS.