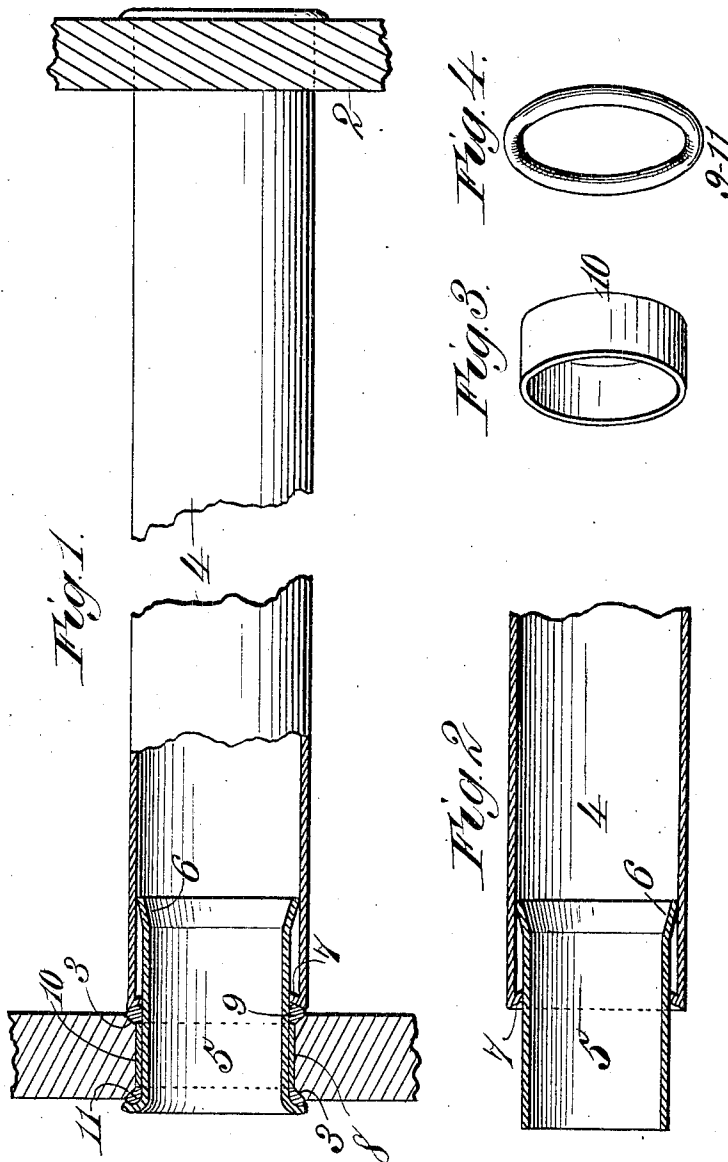


No. 852,278.

PATENTED APR. 30, 1907.

A. LEGGETT.
FLUE JOINT STRUCTURE.
APPLICATION FILED MAY 23, 1906.



Witnesses:
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Att'y.

UNITED STATES PATENT OFFICE.

ALEXANDER LEGGETT, OF MICHIGAN CITY, INDIANA.

FLUE-JOINT STRUCTURE.

No. 852,278.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed May 23, 1906. Serial No 318,394.

To all whom it may concern:

Be it known that I, ALEXANDER LEGGETT, a citizen of the United States, residing at Michigan City, in the county of Laporte and State of Indiana, have invented new and useful Improvements in Flue-Joint Structures, of which the following is a specification.

This invention relates to means for securing tubes or flues in the flue sheets, particularly the furnace sheet; and the object of the same is to so construct the flue ends and to arrange means in cooperation therewith that leakage will be obviated, and rusting at the joints between the flue ends and the sheet prevented without in the least obstructing necessary expansion and contraction in the flues.

By the improved organization of elements and structural features, the flues will be rendered more durable and thus materially economize boiler structures.

The invention consists in the construction and arrangement of the several parts which will be more fully hereinafter set forth.

In the drawing: Figure 1 is a longitudinal section of portions of flue sheets showing a flue disposed therein and connected in accordance with the features of the invention. Fig. 2 is a detail view of the front extremity of the flue. Figs. 3 and 4 are detail views respectively of a sleeve and one of the rings embodied in the flue extremity joint.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numerals 1 and 2 designate the flue sheets which are of ordinary construction with the exception that the openings for the flue in the furnace sheet 1 are reamed out or countersunk as at 3, both in the front and rear sides of the sheet. The improved flue joint is shown applied particularly in connection with the flue extremity engaging the furnace sheet, but it will be understood that the same joint might be employed in connection with the opposite extremity of the flue if found desirable. Furthermore, instead of applying the joint to a flue it might be equally well used with a water tube. The flue 4 has fitted in the extremity thereof, adjacent to the furnace sheet 1, a diametrically reduced extension 5 of similar material, the forward end of said extension being flared outwardly as at 6 to contact with the inner surface of the flue 4; and the free end of the latter is bent inwardly or inwardly flanged as at 7 to

provide a seat in conjunction with the adjacent countersunk edge of the opening 8 through the sheet 1. A soft copper ring 9 is placed over the reduced extension 5 close to the inwardly bent or flanged end 7 of the flue 4; and the extension 5 when inserted through the opening 8 of the sheet 1 causes the said ring 9 to be forced back against the flanged extremity of the flue 4, and when the flue is drawn into place said ring snugly fits in the seat provided by the end of the flue and the countersunk edge of the opening 8. A copper sleeve 10 is fitted over the extension 5 and is of a width corresponding to the thickness of the sheet 1 and bears against the wall of the opening 8. A second soft copper ring 11 is then applied over the projecting end of the extension 5 in rear of the sheet 1 or within the fire box or furnace, and after the last named ring has been applied the extension 5 is expanded and the rear end thereof upset or flared so as to bring the ring 11 in close contact with the rear countersunk edge 3 of the opening 8.

The sleeve 10 serves as a ferrule to incase that part of the extension or the flue structure which is projected through the opening 8 and cooperating with the soft copper rings 9 and 11 produces a tight joint which will overcome any tendency to leakage and will render the connected extremity of the flue exceptionally strong and durable. Furthermore, by the introduction of the copper sleeve or ferrule 10, rusting of the portion of the flue engaging the opening 8 will also be prevented and said part of the flue is practically reinforced or thickened and will not be burnt out so readily as in ordinary flue constructions. By applying the soft copper rings 9 and 11 on opposite sides of the sheet and forcing them closely into the countersunk or reamed out edges 3 of the opening 8, all crevices or openings that might otherwise exist are fully closed, the soft copper rings readily conforming to the contour of the edges of the opening and thus effectively operating to prevent leakage at the joint. The end of the flue 4 against which the soft copper ring 9 has bearing serves as a shoulder to press the said ring into place. In finally completing the joint the usual expanding and rolling implement is used and the pressure exerted thereby from the interior of the flue joint will effect a very snug fitting of the portion of the extension and the sleeve or ferrule 10 with respect to the opening 8.

The improved flue joint will be found exceptionally advantageous, and in view of the economy which arises from the use thereof, owing to the increased durability of the flue
 5 thereby provided, the expense in setting flues or applying flues to flue sheets will not be increased, particularly when it is considered from a comparative standpoint or with respect to the annoyance of frequent repairs
 10 required in the common methods of attaching or securing flue ends in flue sheets.

This mode of securing flues is adapted to be used in general boiler furnace constructions, but it is particularly advantageous in
 15 locomotive engines wherein the flues are apt to become loose owing to the rack and tear thereon due to the vibration caused by the running of such engines.

Having thus fully described the invention,
 20 what is claimed as new, is:—

1. The combination with a flue sheet having an opening therethrough, of a reduced flue extremity fitted in said opening, metal rings on opposite sides of the flue sheet and held
 25 close to the edges of the said opening, and a metal sleeve surrounding the reduced extremity of the flue within the opening or the flue sheet, the rings being also closely held against the opposite side edges of the sleeve.

30 2. In a flue joint structure, the combination with a flue sheet having an opening therethrough, the sheet having the opposite edges around the opening reamed out or countersunk, of a flue having a reduced extremity fitted in said opening, a metal sleeve surrounding the flue extremity within the
 35 opening, and metal rings on the flue extrem-

ity held close to opposite sides of the opening of the flue sheet and within the reamed out or countersunk edges of the sheet around the opening.

3. In a flue joint structure, the combination with a flue sheet having an opening therein, of a flue extremity fitted in said opening, a metal sleeve surrounding the said
 40 extremity and located within the opening, and ring devices applied to the flue extremity and held closely against opposite edges of the opening.

4. In a flue joint structure, the combination with a flue sheet having an opening therein, of a reduced flue extremity inserted in said opening, a metal sleeve surrounding the flue extremity within the opening, and
 50 ring devices held in close contact with opposite edges of the flue sheet opening and the opposite edges of the sleeve by portions of the flue.

5. In a flue joint structure, the combination with a flue sheet having an opening
 60 therein, of a reduced flue extremity inserted in said opening, a copper sleeve surrounding the flue extremity within the opening, and soft copper rings also surrounding the flue extremity and closely held against the opposite
 65 edges of the sleeve.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALEXANDER LEGGETT.

Witnesses:

FRANK J. CONBOY,
 JULIUS C. TRAVIS.