

No. 762,807.

PATENTED JUNE 14, 1904.

A. CRUISE.  
FERRULE FOR BOILER TUBES.  
APPLICATION FILED JULY 15, 1903.

NO MODEL.

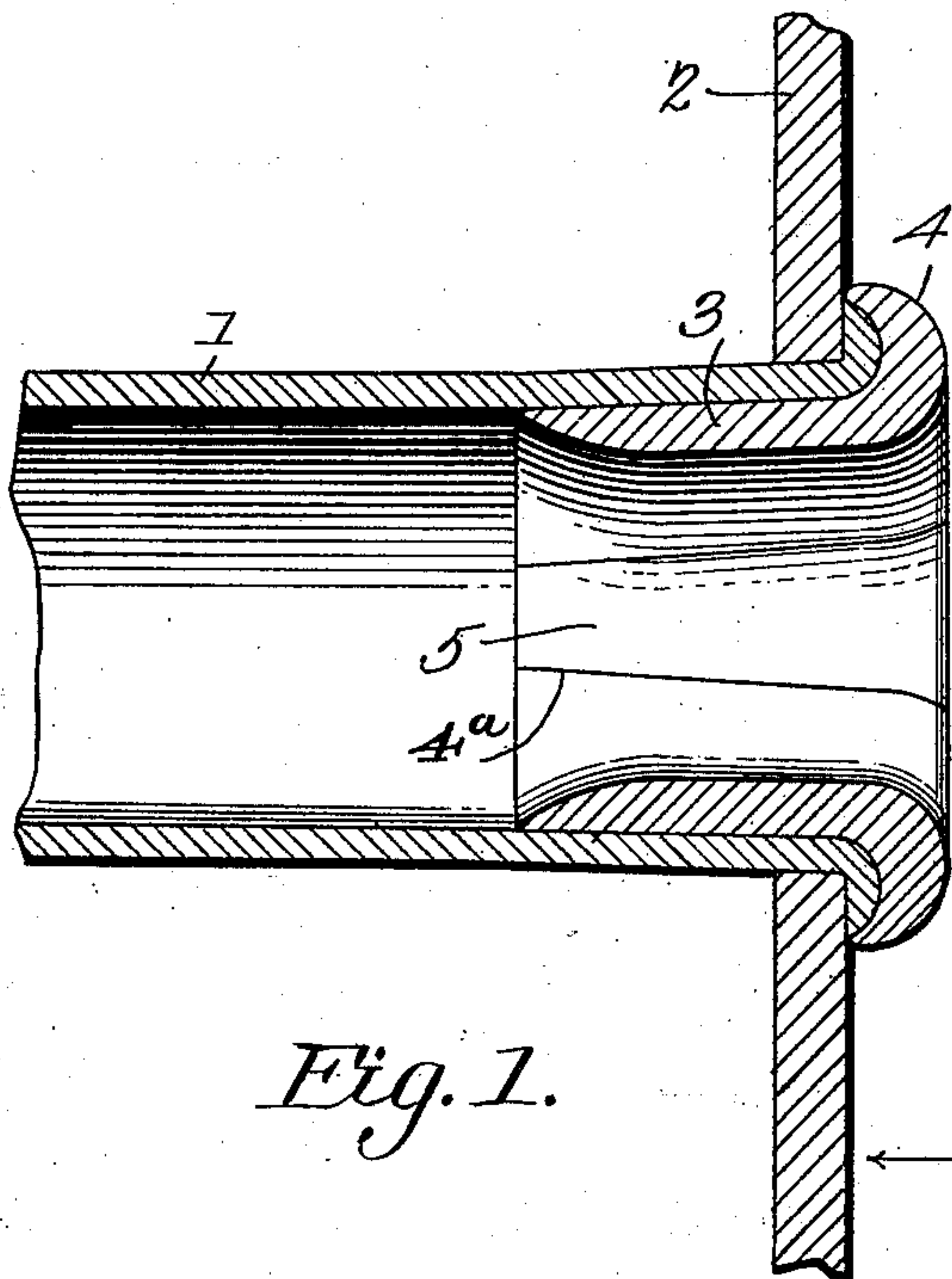


Fig. 1.

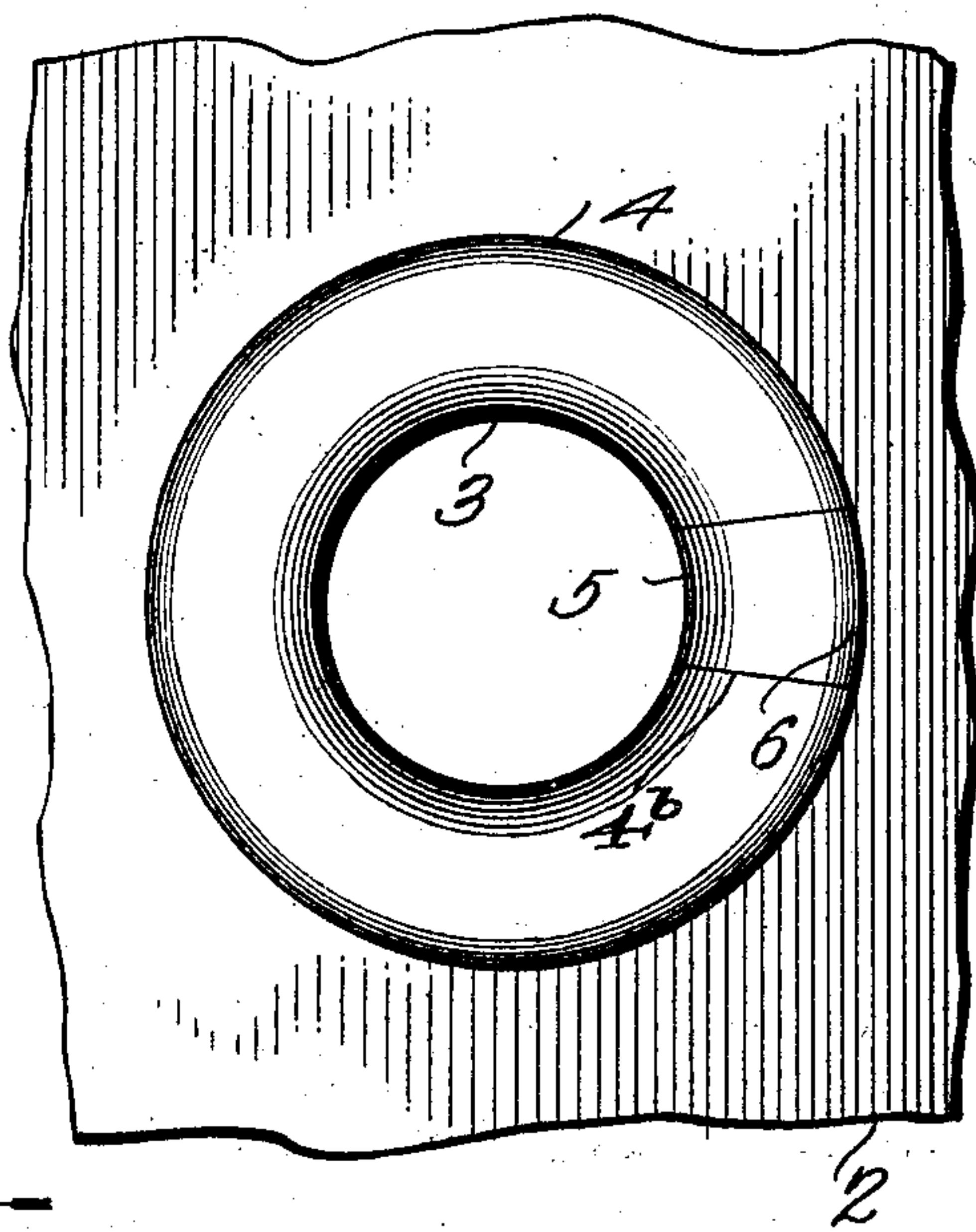


Fig. 2.

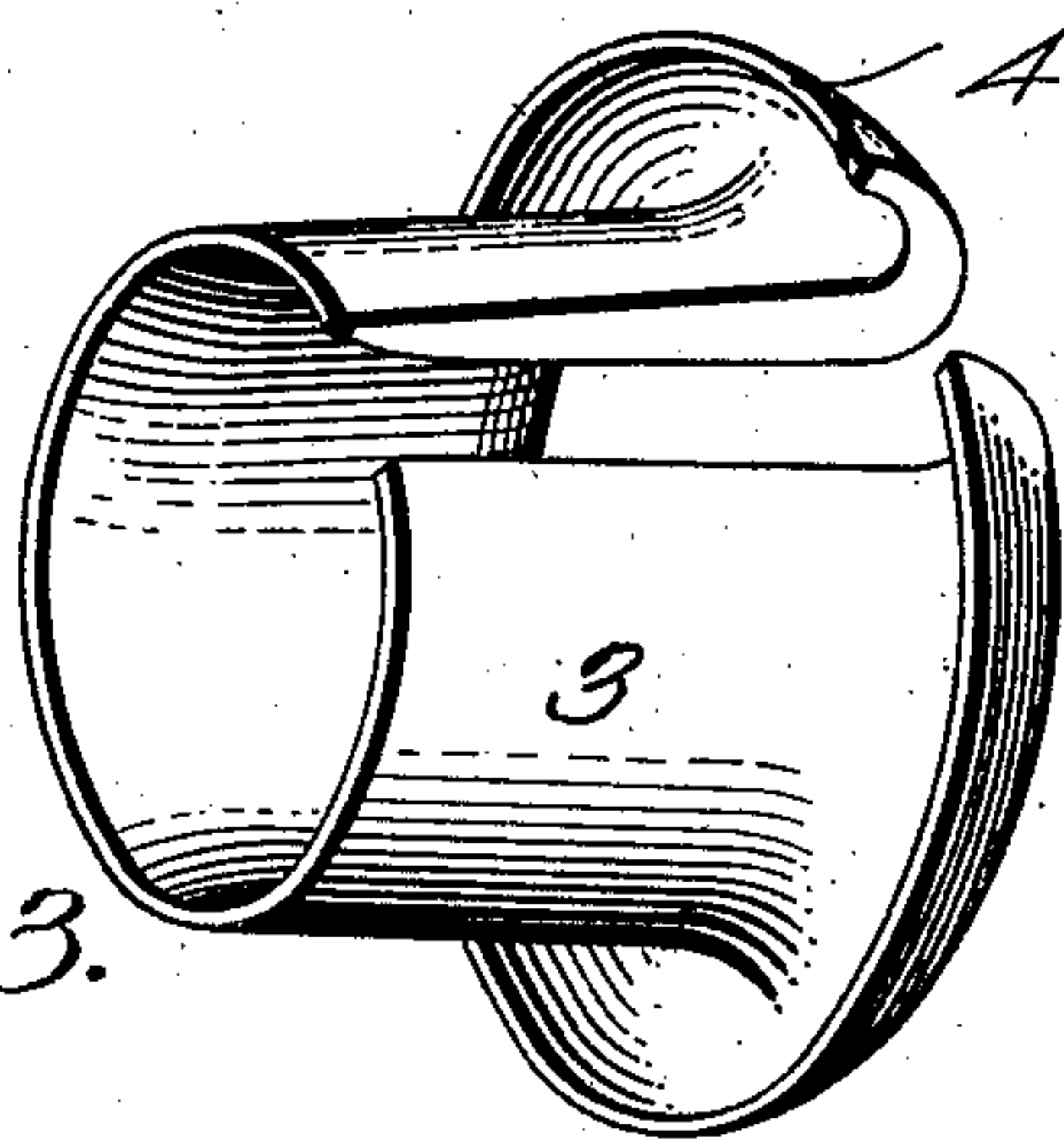


Fig. 3.

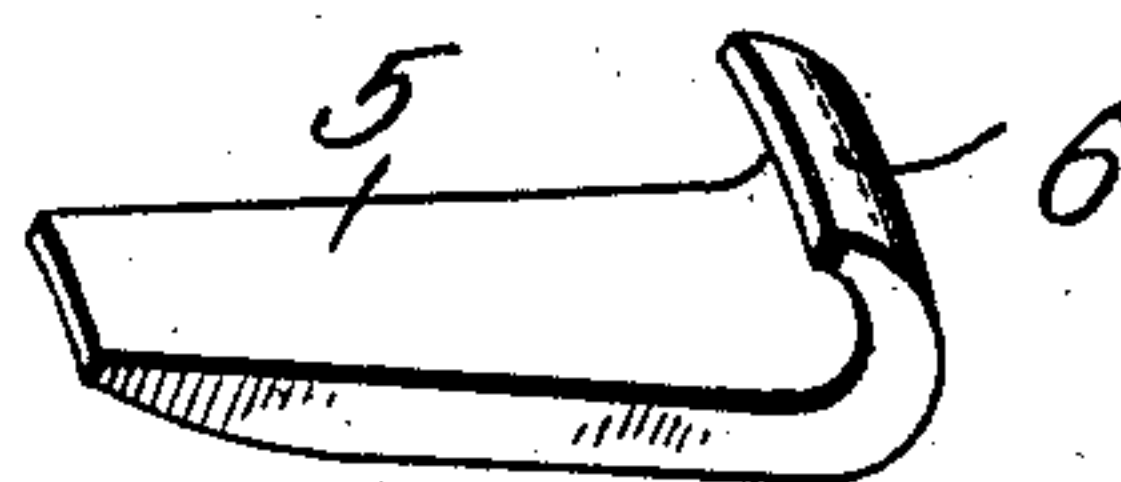


Fig. 4.

Witnesses  
E. F. Stewart  
Dexter Norton

Alexander Cruise, Inventor.  
by C. A. Snow & Co.  
Attorneys



# UNITED STATES PATENT OFFICE.

ALEXANDER CRUISE, OF ELIZABETH PORT, NEW JERSEY, ASSIGNOR OF  
ONE-HALF TO HENRY PURCELL, OF ELIZABETH PORT, NEW JERSEY.

## FERRULE FOR BOILER-TUBES.

SPECIFICATION forming part of Letters Patent No. 762,807, dated June 14, 1904.

Application filed July 15, 1903. Serial No. 165,585. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER CRUISE, a citizen of the United States, residing at Elizabeth Port, in the county of Union and State of New Jersey, have invented a new and useful Ferrule for Boiler-Tubes, of which the following is a specification.

This invention relates to ferrules for boiler-tubes, and more particularly to that type of ferrules comprising a split tube having an outwardly-disposed flange or bead at one end and a key for insertion in the split in the tube to expand it into firm contact with the inner surface of a boiler-tube.

The principal object of the invention is to provide in a ferrule for boiler-tubes of the type specified a key and a split ring so constructed that the key will completely fill the split in the tube and will combine with the split tube to form a structure having an unbroken surface which will completely protect the end of the boiler-tube where it is secured to the flue-sheet.

A further object of the invention is to provide a ferrule for boiler-tubes which may be successfully used in boiler-tubes of slightly-varying sizes by employing keys of different width in connection with split tubes or thimbles of uniform size.

In attaining the objects above stated I make use of the construction and combination of parts of a boiler-tube ferrule hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in section through the end of a boiler-tube where it is joined to the flue-sheet and through a ferrule constructed in accordance with this invention and seated in the end of the boiler-tube. Fig. 2 is an end view looking in the direction of the arrow in Fig. 1. Fig. 3 is a view in perspective of the split tube or thimble, and Fig. 4 is a perspective view of the key.

Corresponding parts are designated with the same characters of reference in the drawings.

Referring to the drawings in detail, 1 designates a boiler-tube, and 2 the flue-sheet, to which the tube is joined in the usual way, the

tube in this instance being shown as thinned by long service and as having the bead formed by upsetting the tube at the time of connection with the flue-sheet reduced somewhat in size.

3 designates the split tube or thimble which forms part of the ferrule of this invention. The split tube or thimble 3 is slightly tapered on the external surface, as shown, and is thinned at the forward end to an edge. At the rear end it is provided with a concavo-convex flange or bead 4, which projects outward and forms a shield for the end of the boiler-tube and the immediately-adjacent portion of the flue-sheet which is subjected to the most destructive effect of the fire. The walls of the split are disposed on converging lines from the bead to the opposite terminal of the thimble to present a wedge-shaped slot 4<sup>a</sup> and are further beveled or inclined to present a dovetailed recess 4<sup>b</sup>, the wider portion of which is disposed at the periphery of the head, as clearly shown in Fig. 2.

5 designates the key, which is somewhat broader than the split in the tube shown in Fig. 3 and is provided at its end with a concavo-convex flange or bead 6 of the same dimensions as that formed on the thimble 3, so that when the key is driven into position, as shown in Fig. 2, the bead on the key will be continuous with that formed on the split tube or thimble 3, and so completely protect the end of the boiler-tube, the key being of the same contour as the walls of the slot and recess, thus to effect a positive juncture between the parts.

It is to be understood that the keys will be made in different sizes and that the material of the split tubes or thimbles will permit considerable expansion of the tubes or thimbles, so that by using keys of different sizes split tubes or thimbles of the same size may be fitted into boiler-tubes of slightly-different sizes. This is especially necessary in boiler-tubes that have become considerably thinned from service and which, therefore, do not conform to standard size.

The keys are made of slightly-tapering form, as shown, so that the greatest expan-



sion of the split tubes or thimbles will be at the rear end, and the forward or inner end may be substantially continuous with the inner surface of the boiler-tube. In order to insure perfect contact of the sides of the keys with the sides of the split in a thimble, the inclination of the sides of the keys will vary slightly in keys of different sizes, the sides of the larger keys being arranged at greater inclinations to each other than those of the smaller keys.

It will be readily seen that when a ferrule is to be placed in position in the end of a boiler-tube the split ring or thimble will first be inserted, and then a key of such size that when inserted it will insure proper contact of the ferrule with the boiler-tube will be selected and forced home in the split in the thimble. When the key has been forced home and the bead thereon becomes substantially continuous with that on the split tube or thimble, the ferrule will be secured in position, and no further operation thereon will be required. The two parts of the ferrule so applied will form, substantially, a single structure and will effectively close any leaks in the end of the boiler-tube, as well as form a reinforce and shield for the end of the tube at its line of juncture with the flue-sheet.

A special advantage of this form of ferrule over those in general use is that in no other ferrule, so far as I am aware, is the surface of the bead at the rear end of the ferrule smooth and unbroken, so as to present a complete protection for the end of the tube at all points. Instead, the keys employed are not of the same contour on the end as the split rings or thimbles, and consequently a portion of the flue-sheet and the end of the boiler-tube will be exposed to the action of fire, so that a leak may be caused at the exposed point.

A further advantage of the invention over

the majority of the ferrules for boiler-tubes now in use is that when the key has been forced home no further action is necessary, whereas the ordinary ferrules have keys of such structure that after the keys have been forced home the ends must be sawed or chipped off to get them out of the way and leave the end of the key substantially flush with the bead on the end of the ferrule.

Having thus described the construction and use of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A ferrule for boiler-tubes, comprising a split tube or thimble, the walls of the split being disposed on converging lines from the head of the thimble to its opposite terminal to present a wedge-shaped slot and being further beveled or inclined to present a dovetailed recess the wider portion of which is disposed at the periphery of the head, and a key conforming to the contour of the walls of the split.

2. A ferrule for boiler-tubes comprising a split tube or thimble having an outwardly-disposed bead extending from one side of the split continuously along the rear edge of the ferrule to the opposite side of the split, the walls of the split being disposed on converging lines from the bead to the opposite terminal of the thimble to present a wedge-shaped slot and being further beveled or inclined to present a dovetailed recess the wider portion of which is disposed at the periphery of the bead, and a key provided with a bead of the same contour as that of the tube or thimble, and conforming to the shape of the walls of the split.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALEXANDER CRUISE.

Witnesses:

JAS. J. MANNING,  
JNO. J. McGRATH.