No. 771,889. PATENTED OCT. 11, 1904.

G. WIEDEKE.

TUBE EXPANDER.

APPLICATION FILED JULY 2, 1904.

NO MODEL.

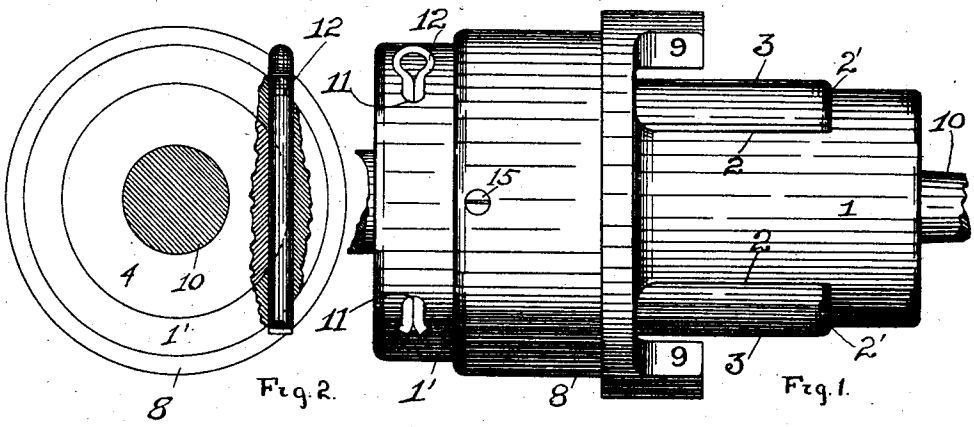

Fig. 2. Fig. 1.

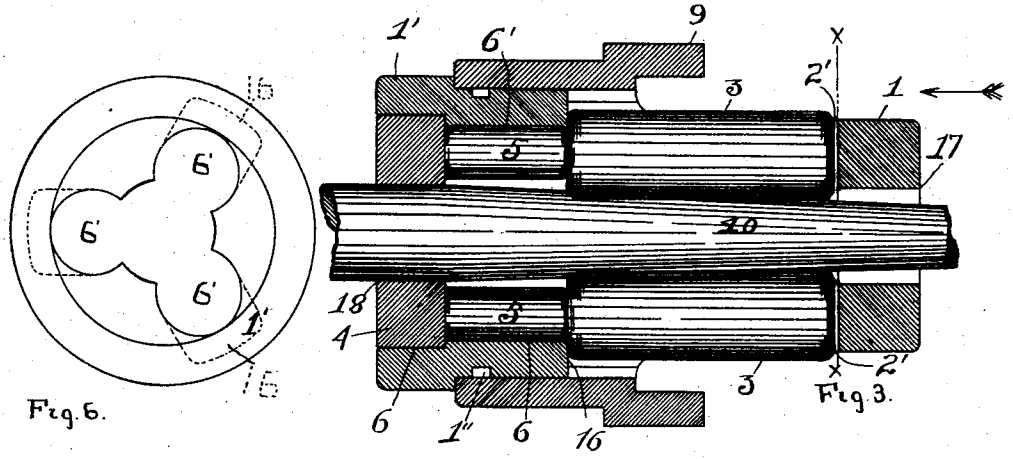

Fig. 6. Fig. 3.

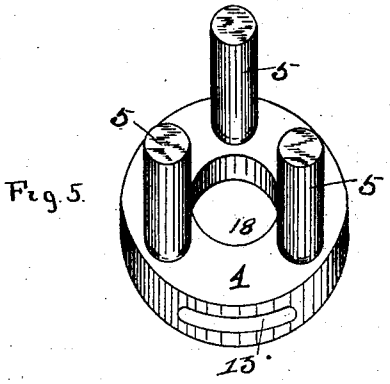

Fig. 5.

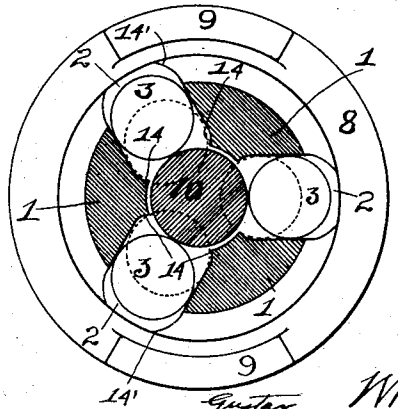

Fig. 4.

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No. 771,889. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

GUSTAV WIEDEKE, OF DAYTON, OHIO.

TUBE-EXPANDER.

SPECIFICATION forming part of Letters Patent No. 771,889, dated October 11, 1904.

Application filed July 2, 1904. Serial No. 215,064. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV WIEDEKE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Tube-Expanders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in tube-expanders or instruments which are inserted in the ends of boiler-tubes to expand the same in uniting said tubes to the tube-sheet or head-plate of a boiler. It is well known that these tube-expanders are placed in the hands of persons who are not skilled mechanics. Therefore it is desirable to combine in such instruments both simplicity and efficiency of construction in order to prolong the efficiency of the same. In view of this it is the object of the present invention to provide a tube-expander with the fewest possible detachable parts in order that the expanding-rolls may be maintained at all times within the frame and prevented from falling out and in order that the unskilled mechanic or other person operating the instrument may have no difficulty in detaching the parts and replacing rolls from time to time. To these ends the parts coöperating to support the expanding-rolls consist of two members—to wit, a frame or holder and a retaining-cap, with integral adjunctive devices, all as hereinafter more fully described.

Preceding a detail description of the invention reference is made to the accompanying drawings, of which—

Figure 1 is a horizontal elevation of my improved tube-expander, showing the expanding-rod or mandrel broken away at both ends of the instrument. Fig. 2 is a rear view, partly in section, to disclose the pin which interlocks the frame with the retaining-cap. Fig. 3 is a horizontal longitudinal section. Fig. 4 is a section on the line x x of Fig. 3 as indicated by the arrow. Fig. 5 is a perspective view of the retaining-cap. Fig. 6 is a rear view with the retaining-cap removed.

In a detail description of the invention similar reference characters indicate corresponding parts.

The supporting-frame consists of a forward portion 1 and a rearward portion 1′ of increased diameter. In the portion of said frame having the smallest diameter—to wit, that portion indicated by 1—there are three longitudinal slots 2, through which the lengths of the expanding-rolls 3 project to make contact with the interior surface of the tube. The forward ends of the slots 2 terminate in walls or shoulders 2′, that serve as abutments for the adjacent or front ends of the rolls, and thus prevent said rolls from dropping or moving forwardly in said slots. The rearward portion 1′ of said frame is recessed or milled out, as at 6, for the reception of a retaining-cap 4, which fits therein and the outer surface of which is flush with the extreme end of said portion 1′. From this cap 4 there are projected parallel pins 5, which correspond in number to the rolls 3. These pins occupy openings or spaces 6′, that extend from the recess or cavity 6 and communicate with the roll-openings 2. The forward ends of these pins 5 lie adjacent to the rearward ends of the rolls and prevent said rolls from falling rearwardly out of the frame when the mandrel 10 is removed. The said rolls at such times are permitted to drop inwardly toward the axis of the frame to the extent shown in dotted lines in Fig. 4.

14 designates a series of interior shoulders extending throughout the lengths of the roll-openings 2 and which serve to prevent the rolls from moving inwardly from said openings 2 or in a direction toward the longitudinal axis of the frame when the mandrel is removed. The rolls 3 are likewise prevented from moving laterally in an outward direction from said openings 2, owing to the outward longitudinal edges 14′ of the roll-openings, which edges extend a suitable distance toward each other to decrease the width of said openings at these points to less than the width of the longitudinal axes of said openings.

When the mandrel 10 is in position to expand the rolls, the rearward ends of said rolls abut not only with the retaining-pins 5, but also with the shoulders 16 on the forward portion of the enlarged part 1′ of the frame.

As before stated, when said mandrel is removed the rolls are restricted or prevented from falling out of the frame rearwardly only by the pins 5. In other words, the interior longitudinal shoulders 14 of the roll-openings 2 prevent said rolls from moving inwardly to a position that would permit them to drop forwardly from the frame through the mandrel-opening 17 in part 1 of said frame or to drop rearwardly through the mandrel-opening 18 in the cap 4, and the pins 5 prevent said rolls from passing rearwardly from the frame through the openings 2 and the adjoining openings 6′ in part 1′ of the frame. The retaining-cap 4 is maintained in position by a transverse pin 12, which passes through openings 11 in the rearward portion of the frame and the body of which pin lies in a peripheral slot 13 in the cap 4. When the pin 12 is inserted, as in Figs. 1 and 2, the cap 4 becomes firmly locked, and its detachment or removal from the frame is easily accomplished by withdrawing the pin 12.

Surrounding a part of the rearward portion 1′ of the frame is a guard 8, which is secured thereto by a set-screw 15, which passes through said guard and enters a peripheral groove 1″ in the outer surface of the frame portion 1′. Projecting from opposite sides of said guard are two flanges 9 9, which serve as stops against the sheet or boiler-head (not shown) and support the instrument in a proper position in the tube.

Having described my invention, I claim—

1. In a tube-expander, a frame having a plurality of roll-openings with expanding-rolls therein, the inner longitudinal edges of said openings forming shoulders which prevent the rolls from moving inwardly to the longitudinal axis of the frame when the mandrel is removed, the rearward portion of said frame having a recess or cavity 6 from which extend parallel openings 6′ that communicate with the rearward terminals of the roll-openings, a cap 4 fitting within the cavity 6 and possessing a series of pins permanently fixed to said cap, said pins serving to retain the expanding-rolls from rearward movement when the mandrel is removed from the instrument, and means for uniting said cap with the rearward portion of the frame.

2. In a tube-expander, a frame having a plurality of roll-openings with expanding-rolls mounted therein, the inner longitudinal edges of said roll-openings terminating in shoulders which limit the movement of the rolls toward the longitudinal axis of the frame when the mandrel is removed, the rearward end of said frame being enlarged and provided with a recess 6 with openings 6′ extending forwardly therefrom, the openings 6′ communicating with the rearward terminals of the roll-openings, a cap occupying said recess 6, said cap having a plurality of parallel pins 5 fixed thereto and occupying the openings 6′, and a detachable pin passing transversely through the rearward portion of the frame and engaging the cap to secure the same within the rear end of the frame.

3. In a tube-expander, a frame the rearward end of which is larger in diameter than the diameter of the forward portion, said forward portion having parallel roll-openings adapted to receive expanding-rolls, the rearward portion of said frame having a recess or cavity with openings extending therefrom and communicating with the roll-openings, a cap fitting within the cavity in the rearward end of the frame, said cap having pins fixed thereto and projected from the inner face thereof, and a pin uniting said cap to the rearward part of the frame.

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

GUSTAV WIEDEKE.

Witnesses:
R. J. McCarty,
Carolyn M. Theobald.