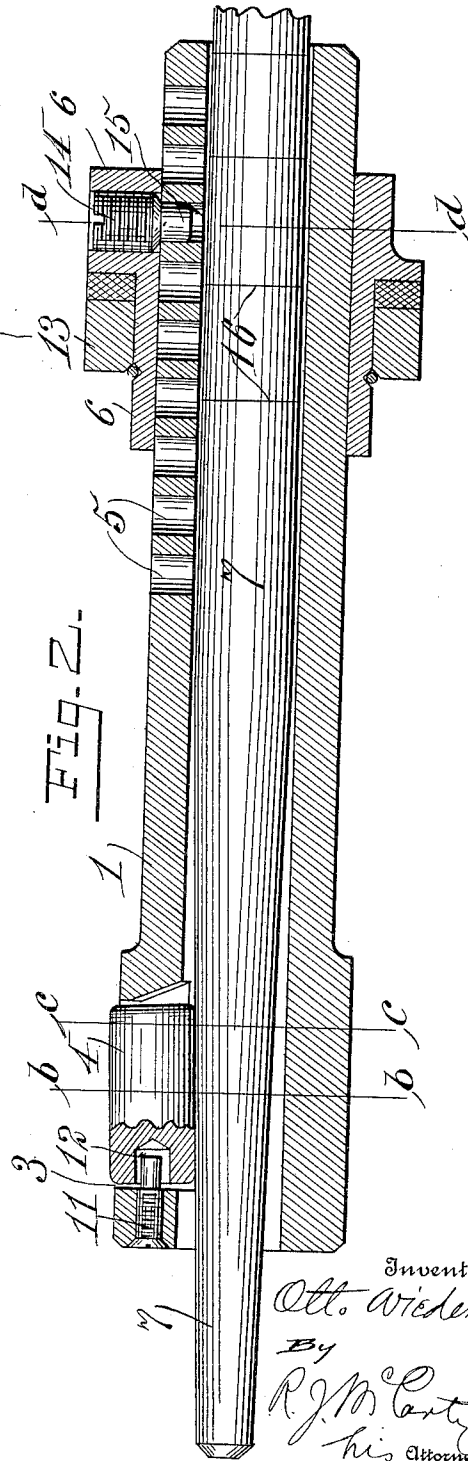
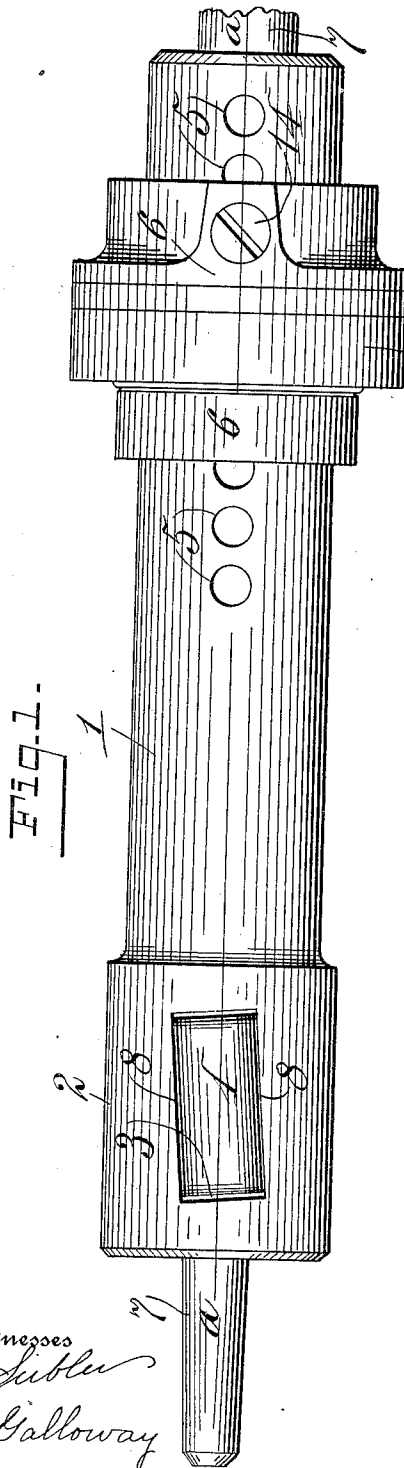


O. WIEDEKE.  
TUBE EXPANDER.  
APPLICATION FILED SEPT. 24, 1913.

1,089,170.

Patented Mar. 3, 1914.

2 SHEETS-SHEET 1.



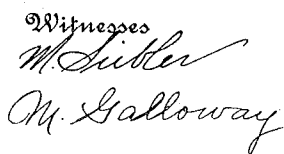
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APPLICATION FILED SEPT. 24, 1913.

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2 SHEETS--SHEET 2.



By

Inventor  
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R. M. Canterbury  
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# UNITED STATES PATENT OFFICE.

OTTO WIEDEKE, OF DAYTON, OHIO, ASSIGNOR OF ONE-HALF TO GUSTAV WIEDEKE,  
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## TUBE-EXPANDER.

1,089,170.

Specification of Letters Patent.

Patented Mar. 3, 1914.

Application filed September 24, 1913. Serial No. 791,505.

*To all whom it may concern:*

Be it known that I, OTTO 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 letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to certain improvements in tube expanders or implements for expanding the tubes of boilers.

To be more specific, the expander is especially adapted for expanding arched tubes which, owing to the distance the expander is required to be inserted, it must be longer than the ordinary tube expander which is used for expanding straight tubes.

The objects of the invention are several, principal among which is to provide means in this type of tube expander for preventing the expanding rollers from dropping inward and becoming displaced from the tool when the mandrel is withdrawn; and further, to provide means for connecting the guard to the body of the tool so that there will be no interference with the free operation of the tool when properly inserted in a tube.

A further object of the invention is to provide convenient means for enabling the operator to determine the extent of insertion of the mandrel as the tool is being operated to expand the tube.

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

Figure 1 is a longitudinal side elevation of a tube expander constructed in accordance with my invention; Fig. 2 is a longitudinal section of the same; Fig. 3 is a section on the line *b—b* of Fig. 2; Fig. 4 is an end elevation of Fig. 1; Fig. 5 is a section on the line *c—c* of Fig. 2; Fig. 6 is a view of the mandrel removed from the body; Fig. 7 is a sectional view on the line *d—d* of Fig. 2; Fig. 8 is a full size sectional view of the end of the tool with the mandrel removed as well as the expanding rollers.

In the detail description of the invention,

similar reference characters indicate corresponding parts both in the drawings and specification.

The body of the tool is lengthened as compared with the ordinary tube expander because of its being designed to expand arched tubes. The said body consists of a shank or barrel 1 terminating at its forward end in a head 2 provided with the usual openings 3 for the expanding rollers 4 to project through in making contact with the surrounding surfaces of the boiler tube. The said barrel 1 is provided with a row of openings 5 which will be again referred to in connection with the guard 6. The mandrel 7 is insertible throughout the length of the barrel in the usual manner and is made tapered to form a wedge-like engagement with the inner sides of the expanding rollers 4.

Reference has been made to the openings 3 through which the rollers project. The longitudinal sides 8 of said openings are curved inwardly in the usual manner to prevent the rollers from falling out of the head. I will now describe the means which constitute a feature of the present means, for preventing said rollers from falling inwardly and out of the head when the mandrel is withdrawn. In order to facilitate and make possible the placing of the expanding rollers in position and maintaining them in such position against any tendency to fall inwardly within the head when the mandrel is withdrawn, the inner ends of the slots or openings 3 are provided with outward and rearwardly tapered surfaces 3' said tapered surfaces extending from straight surfaces 3''. The tapered surfaces 3' permit the rollers to be inserted in the interior of the head 2 and raised to a parallel position, which is the operative position of the rollers, as shown in Figs. 1 & 2. In Fig. 8 the dotted lines show the manner of inserting the rollers. When in the operative position, the straight surfaces 3'' form shoulders which maintain the rollers against any lengthwise shifting while in operation. Extending from the inner longitudinal margins of the roller openings are inwardly projecting shoulders 9 which extend from the inner terminals of the tapered surfaces 3' a sufficient distance to support the rearward ends of the rollers from falling inwardly when the mandrel is withdrawn.

In inserting the rollers in the manner shown in dotted lines in Fig. 8, the rearward end of each roller is moved into position above the shoulders 9, such movement being permitted by the tapered surfaces 3'. The extreme end of the head 2 is provided with openings 10 which may be wholly or partially screw-threaded to receive screw pins 11 the inner ends of which are formed to enter cavities 12 in the ends of the rollers 4. By this means the forward ends of the rollers are prevented from falling inwardly when the mandrel is withdrawn from the barrel. It will be noted in Fig. 2 that the cavities 12 are somewhat larger than the projecting ends of the pins 11. This is an essential characteristic in order that a free expanding movement may be imparted to said rollers by the mandrel without any interference from the supporting pins.

The guard or ring 6, before referred to, is inclosed by the usual bearing or collar 13. Heretofore, so far as I am aware, it has been the practice to unite the said guard to the body of the tool by means of set screws which engage the outer circumference of the barrel and are provided with heads which project beyond the circumference of the guard. These means are often found objectionable in manipulating the implement because of the fact that the heads of the screws frequently come in contact with parts of the boiler head when rotating the implement in the operation of expanding the tubes. With the present improvement the set screws 14 are reduced at their inner ends in diameter, as at 15, to enable said screws to enter the openings 5 in the barrel and to be inserted below the circumference of the guard 6. A number of such openings 5 are provided in the barrel to enable the collar to be shifted to the desired position and there firmly secured.

In manipulating the implement, it will be understood that the mandrel 7 is forced into the barrel as the work of expanding progresses in order to exert a progressive outward force on the expanding rollers. Heretofore, so far as I am aware, the operator had no guide to direct him in this matter in order that he might know the extent of the insertion of the mandrel. In order to overcome this objection, I have provided on the outer end of the mandrel a series of equidistant circular lines 16. These lines form an index by which the operator may know the

extent of the insertion of the mandrel necessary in performing the work.

Having described my invention I claim.

1. A tube expander, comprising an elongated cylindrical body terminating at one end in a head provided with the necessary roller apertures, the rearward end walls of said apertures being tapered outwardly and the said walls of said apertures having inwardly lying shoulders extending therefrom, a series of expanding rollers confined within said openings the rearward ends of which lie between said shoulders and the outer longitudinal edges of the apertures, said rollers having each an aperture in its outer end, and means projected through the head and engaging said last named apertures to support the outer ends of said rollers, substantially as specified.

2. A tube expander, comprising a cylindrical body terminating at one end in a head provided with roller openings, the rearward walls of said openings being tapered and the rearward sides of said openings having shoulders extending inwardly therefrom, a series of expanding rollers within the openings in said head, said rollers having axial openings in the outer ends thereof, pins projected through said head and entering said axial openings, said axial openings being substantially larger than the inclosed ends of the pins whereby means are provided for preventing the rollers from becoming dislodged in the head and for enabling the mandrel to expand said rollers, substantially as specified.

3. In a tube expander, a cylindrical body, a series of expanding rollers mounted in said body, and a mandrel adapted to be inserted in said body to expand said rollers, said mandrel having gage marks on the surfaces thereof, and means for preventing the rollers from being dislodged from said body when the mandrel is withdrawn, said means comprising interior shoulders projecting from the rearward ends of the roller openings, and pins extending into openings in the ends of said rollers, substantially as specified.

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

OTTO WIEDEKE.

Witnesses:

P. J. FRAWLEY,  
MELLIE GALLOWAY.