No. 741,636. PATENTED OCT. 20, 1903.

W. E. DONEHOWER & S. CHILSON.

FLUE EXPANDER FOR EXPANDING THE FLUE JOINTS OF BOILERS.

APPLICATION FILED AUG. 5, 1902.

NO MODEL.

Fig. 1.

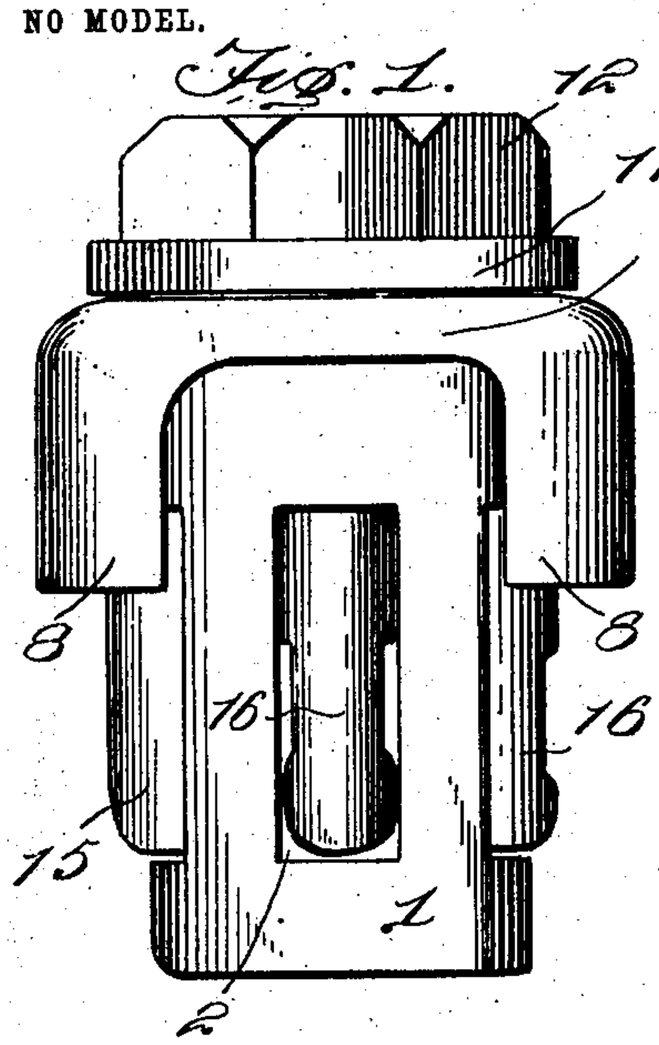


Fig. 2.

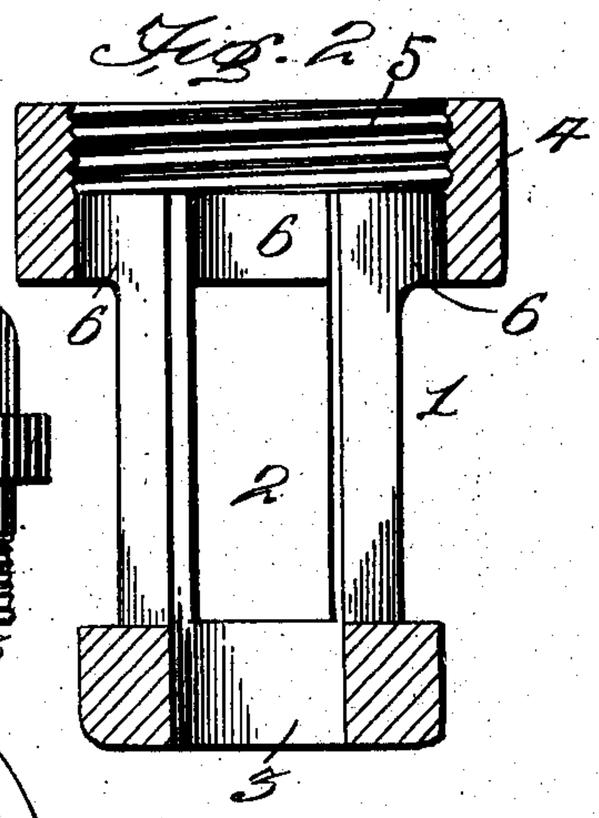


Fig. 3.

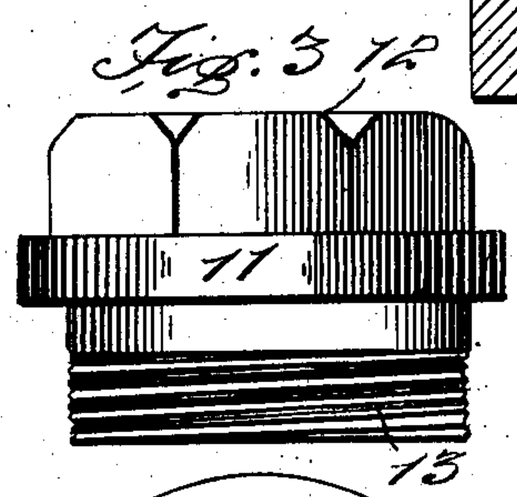


Fig. 4.

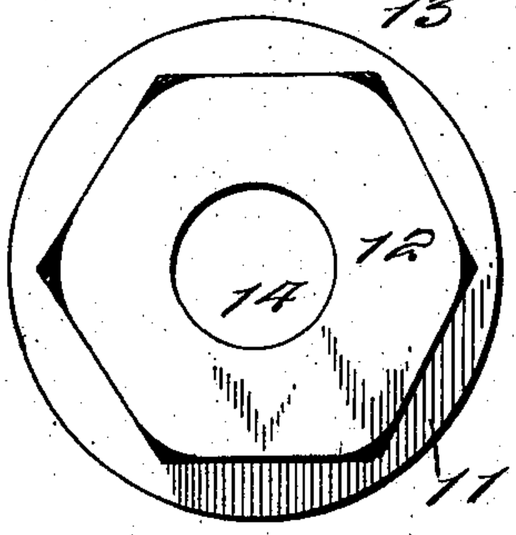


Fig. 5.

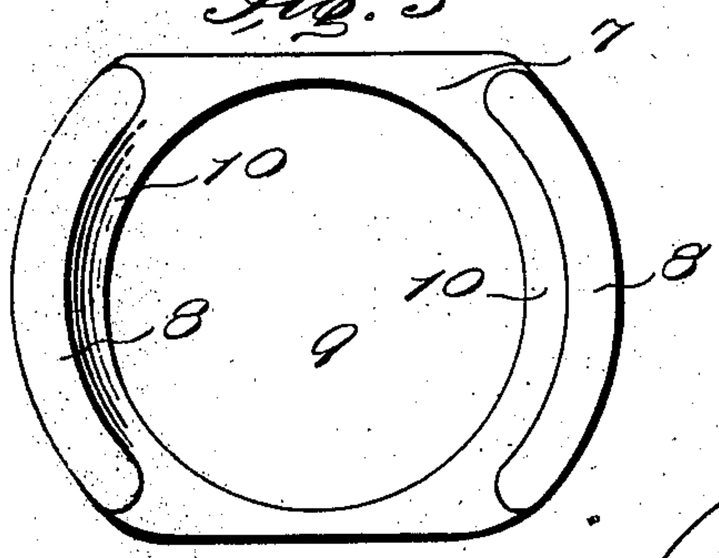


Fig. 6.

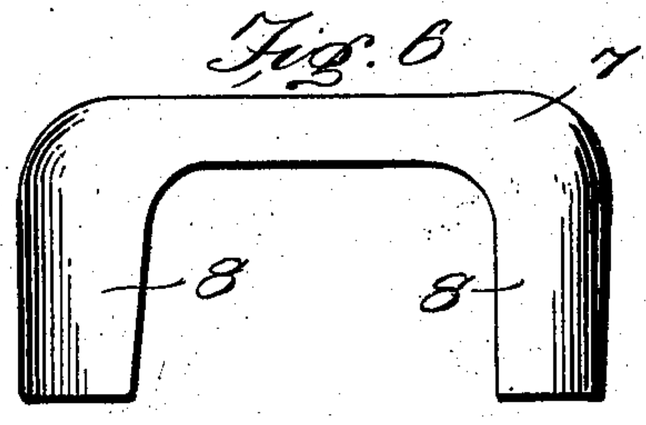


Fig. 7.

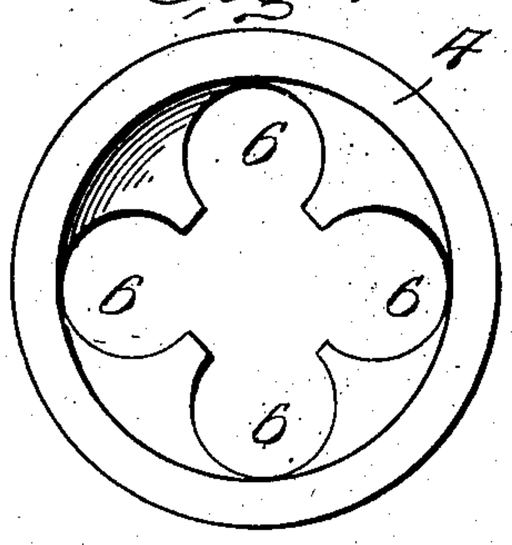


Fig. 8.

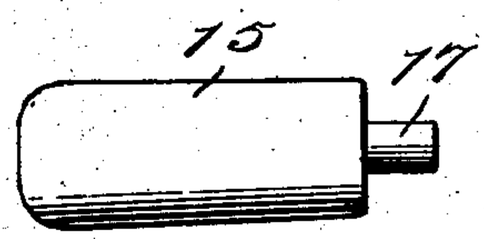


Fig. 9.

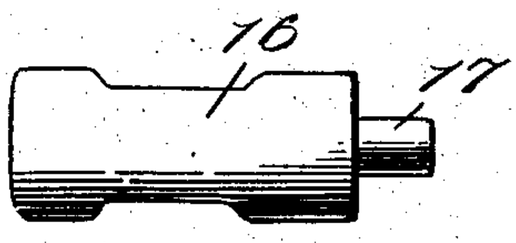
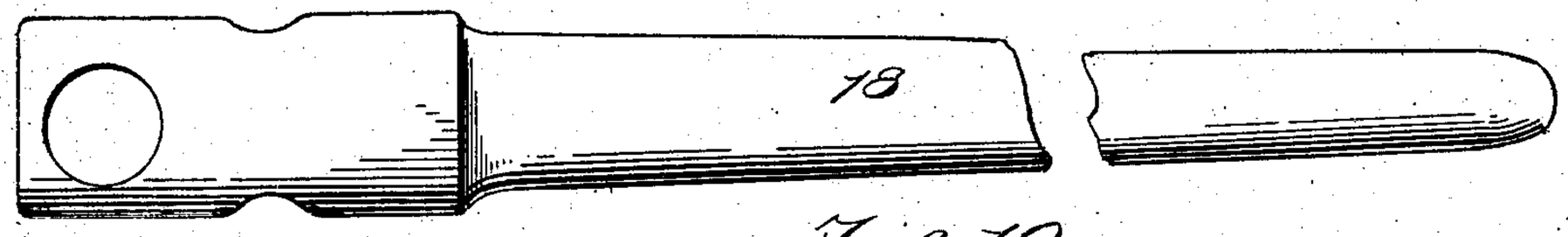


Fig. 10.



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No. 741,636. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM E. DONEHOWER AND SAMUEL CHILSON, OF OMAHA, NEBRASKA.

FLUE-EXPANDER FOR EXPANDING THE FLUE-JOINTS OF BOILERS.

SPECIFICATION forming part of Letters Patent No. 741,636, dated October 20, 1903.

Application filed August 5, 1902. Serial No. 118,462. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM E. DONEHOWER and SAMUEL CHILSON, citizens of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Flue-Expanders for Expanding the Flue-Joints of Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in flue-expanders for expanding the flue-joints of boilers.

The present invention has for its objects, among others, to provide a simple and cheap yet efficient construction of expander embodying two grooved rollers, two tapered rollers, and a screw-cap, whereby the joints may be more easily and quickly expanded. By our invention the pressure being obtained by the rollers urged outward by the tapered drive-pin the joint is better and more easily expanded.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be specifically defined by the appended claim.

The invention in its preferred form is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this specification, and in which—

Figure 1 is an elevation of the device complete with the tapered driving-pin removed. Fig. 2 is a central longitudinal section through the body portion of the expander. Fig. 3 is an elevation of the screw-cap. Fig. 4 is a top plan thereof. Fig. 5 is a top view of the guide. Fig. 6 is a side elevation thereof. Fig. 7 is a top view of the body portion of the expander. Fig. 8 is a view of one of the tapered rollers removed. Fig. 9 is a similar view of one of the grooved rollers. Fig. 10 is a view of the tapered driving-pin.

Like numerals of reference indicate like parts throughout the several views in which they appear.

Referring now to the drawings, 1 designates the body portion of the expander, which is provided with the longitudinal openings 2, through which the rollers project, and with the central bore 3 for the passage of the driving-pin. It is formed at its upper end with an interiorly-screw-threaded ring portion 4, having the threads 5, as seen best in Fig. 2, and with the four substantially circular openings 6, in which the rollers are adapted to be received, as will hereinafter appear.

7 is the guide. It is provided with the oppositely-disposed depending portions 8, which embrace opposite sides of the body portion, as seen best in Fig. 1, and has the central opening 9, the portion 10, resting upon the top of the body portion, and the screw-cap 11, having the polygonal portion 12 and depending screw-threaded portion 13 to engage the threads 5 of the body portion, fits over the same and holds the guide in place, as is seen clearly in Fig. 1. This cap has the central opening 14 for the passage of the tapered driving-pin.

15 represents tapered rollers, of which there are two, only one of which, however, can be seen in Fig. 1, and 16 represents the grooved rollers, of which there are two, both of which are shown in said Fig. 1. They are each provided with a projecting stem 17, as shown in Figs. 8 and 9.

18 is the tapered driving-pin.

In practice the parts are assembled as seen in Fig. 1, the two grooved rollers being adjacent and the two tapered rollers being next to each other. Instead of depending upon the taper of the driving-pin we arrange the said pin to work within the space bounded by the rollers and to act thereto to force them outward and in contact with the inner surface of the flue, and a tight joint is thus formed. By the use of the grooved rollers additional pressure is obtained and exerted by the shoulders of the said rollers, as will be evident from Fig. 1.

From the above it will be seen that we have devised a novel and cheap yet efficient form of flue-expander, and while the structural embodiment of the invention as herein disclosed is what we at the present time consider the preferable one it is evident that the same is subject to changes, variations, and modifications without departing from the spirit of the invention or sacrificing any of its advantages, and we therefore reserve the

right to make such changes, variations, and modifications as come properly within the scope of the protection prayed.

What is claimed as new is—

The flue-expander herein described, consisting of the body portion having the lower reduced or small ring, the series of vertical slots and the upper enlarged collar having interior screw-threads, a series of grooved and a series of smooth rollers mounted on the said slots, the guide fitting in the upper collar of the body portion and having the pair of depending portions embracing opposite sides of the body portion, the flanged screw-cap having the flange resting on the guide and the threads engaging the threads of the collar and the tapered driving-pin.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM E. DONEHOWER.
SAMUEL CHILSON.

Witnesses:
H. A. STURGES,
LOUIS MIKKLESEN.