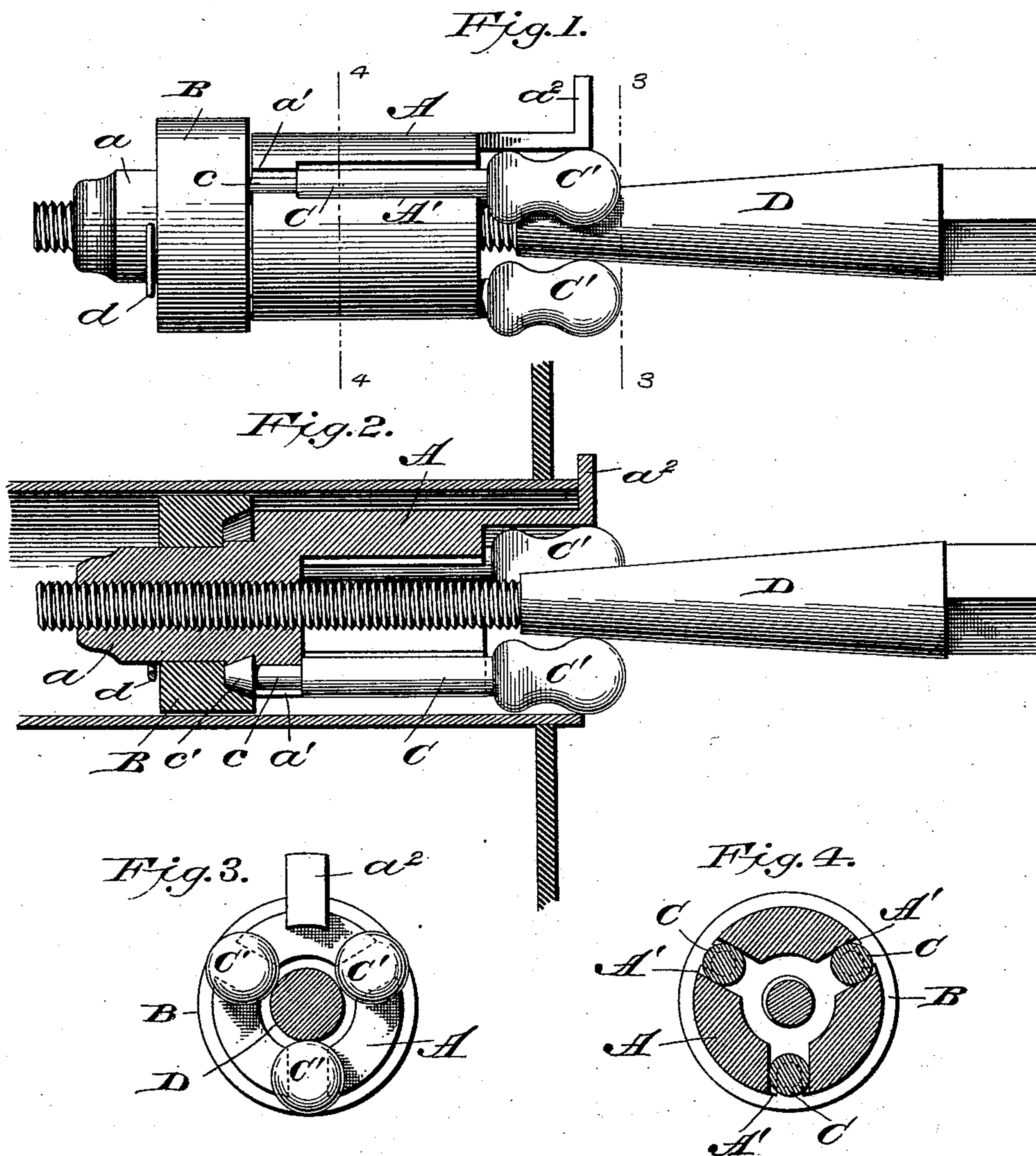


(No Model.)

W. M. BULLOCK.  
TUBE EXPANDER.

No. 529,244.

Patented Nov. 13, 1894.



William M. Bullock  
INVENTOR

WITNESSES  
J. S. Elliott,  
H. S. Deall.

— by *[Signature]* Attorney



# UNITED STATES PATENT OFFICE.

WILLIAM M. BULLOCK, OF LAKEVILLE, INDIANA.

## TUBE-EXPANDER.

SPECIFICATION forming part of Letters Patent No. 529,244, dated November 13, 1894.

Application filed August 30, 1894. Serial No. 521,743. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. BULLOCK, a citizen of the United States of America, residing at Lakeville, in the county of St. Joseph, and State of Indiana, have invented certain new and useful Improvements in Tube or Flue Expanders; and I do hereby 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 letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in tube expanders, the same being designed more especially for expanding and swaging the ends of boiler tubes; and it consists more particularly in pivotally mounting swaging rollers upon a head which is apertured and threaded for the passage of the mandrel, the mandrel having a tapered portion which contacts with the heads of the swaging rollers, said rollers being so shaped that they will expand the tube or swage it upon each side of the flue-sheet of the boiler; and with this end in view my invention further consists in the construction and combination of the parts, as will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings which form part of this specification, Figure 1 is a side view of a tube expanding and swaging device constructed in accordance with my invention. Fig. 2 is a sectional view showing the application of the invention. Fig. 3 is a sectional view on the line 3—3 of Fig. 1, and Fig. 4 is a sectional view on the line 4—4 of Fig. 1.

A designates the head of the device which is provided with a portion  $a$  apertured and internally threaded for the passage of the screw-threaded end of the mandrel. The end portion  $a$  is also provided with shallow recesses for the reception of a locking key which retains upon the head a ring or band B.

The head A is provided with a suitable number of longitudinal recesses  $A'$  which are reduced near their forward ends, as shown at  $a'$ , to provide a smaller recess which receives the reduced portion of the spindle of each swaging roller C, and the head is also pro-

vided with a projecting portion  $a^2$  with an outturned end which is adapted to abut against the outer end of the boiler tube and properly position the device therein, as shown in Fig. 2.

The spindle of each swaging roller C has a reduced portion  $c$  which lies in the recess  $a'$ , as hereinbefore mentioned, and beyond said reduced portion each spindle is provided with a conical head  $c'$  which fits in recesses therefor in the head and against which the band B abuts to hold the swaging rollers pivotally and rotatably in place, the band B being held in place by the locking-key  $d$  hereinbefore described. The heads  $C'$  of the swaging rollers are centrally grooved so that in use they will expand the boiler tube on both sides of the flue-sheet and swage the end upon the outer surface of the same.

The mandrel D has a conical portion which bears against the end portions of the swaging heads and causes the rotation of the swaging rollers as the mandrel is turned.

This device is readily applied to a boiler tube and is complete in itself and expands or swages the metal on each side of the flue-sheet.

I am aware that prior to my invention it has been proposed to provide tube expanders with rotary cylinders against which a tapered mandrel bears to expand the tube by contact with rollers, and I do not claim such construction broadly as my invention; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a tube expanding and swaging device, the combination, of a head having a threaded central aperture and longitudinal recesses as shown, swaging rollers C pivotally and rotatably mounted in the longitudinal recesses and having on the ends beyond the recesses centrally grooved heads  $C'$ , a mandrel threaded for engagement with the aperture in the head and provided with a tapered portion which engages with the swaging heads, so as to spread the same, and a ring held upon the head for retaining the pivoted rollers in place, substantially as shown and for the purpose set forth.

2. In a tube expanding and swaging device, the combination, of a head having at one end a reduced portion with a threaded central ap-

erture and longitudinal recesses  $A' a'$ , swaging rollers  $C$  having heads  $C'$  and reduced spindles beyond which are conical heads, a guide or strip  $a^2$  carried by the head, and a  
5 mandrel  $D$  for engagement with the head and swaging rollers, substantially as shown and for the purpose set forth.

3. In a tube expanding and swaging device, the combination, of a head having a guide  $a^2$ ,  
10 a threaded central aperture and longitudinal recesses as shown, swaging rollers  $C$  rotatably mounted in the longitudinal recesses and having reduced shanks with conical ends  $c'$  which bear in recesses in the head, a ring  $B$  held

against the conical ends by a locking key  $d$ , the 15 heads of the swaging rollers being centrally grooved, together with a mandrel  $D$  having a screw-threaded end which engages the threaded recess in the head and a conical portion which engages the swaging rollers which 20 expand the tube on each side of the flue-sheet, substantially as shown and described.

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

WILLIAM M. BULLOCK.

Witnesses:

B. M. BULLOCK,  
A. O. VAN LIEW.