(No Model.)

F. SULTER.

TUBE EXPANDER.

No. 328,622. Patented Oct. 20, 1885.

Fig. 1.

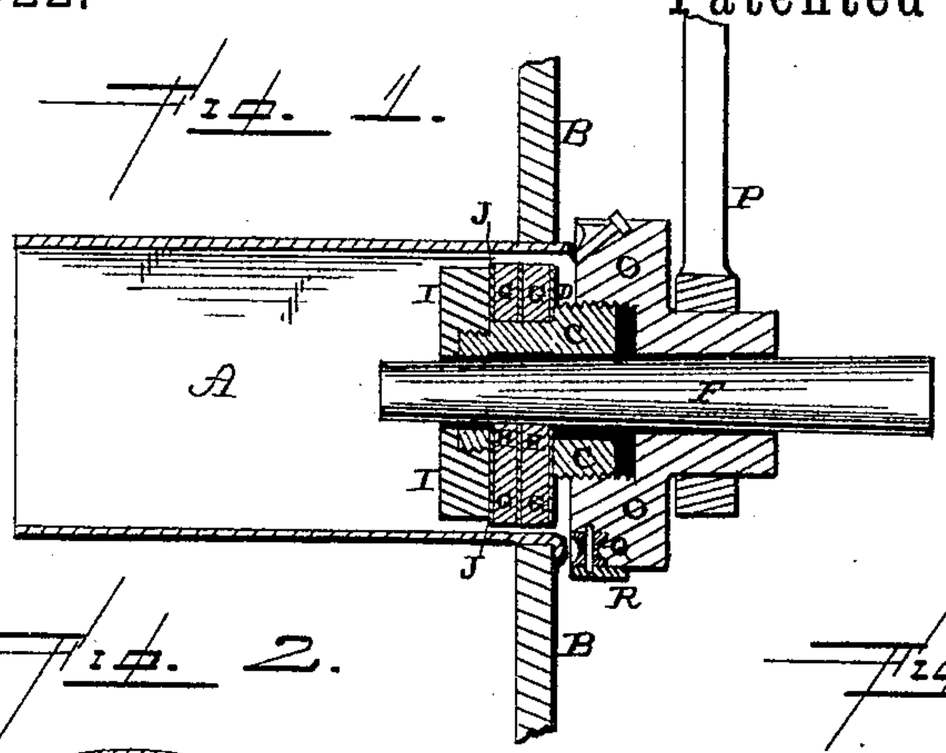


Fig. 2.

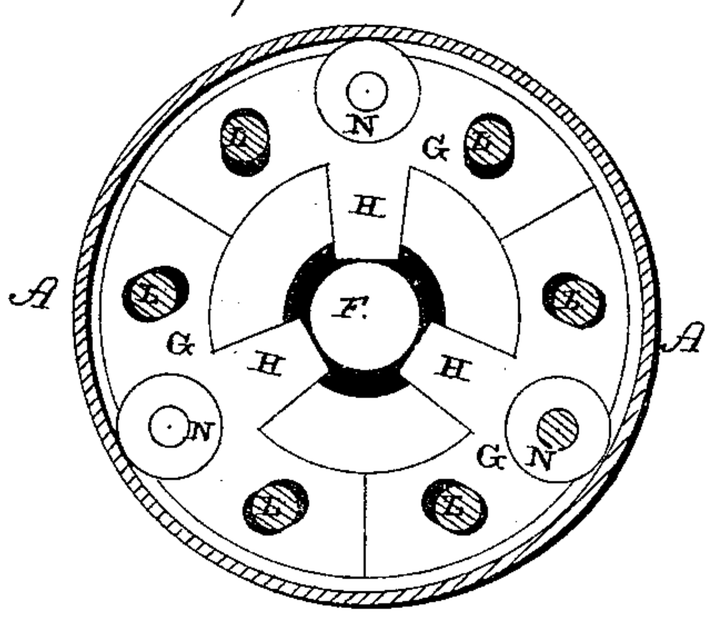


Fig. 3.

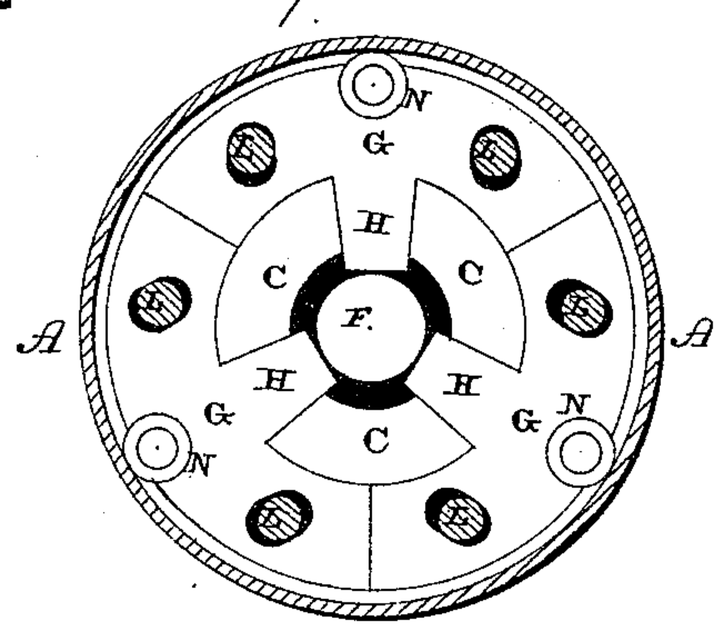


Fig. 4.

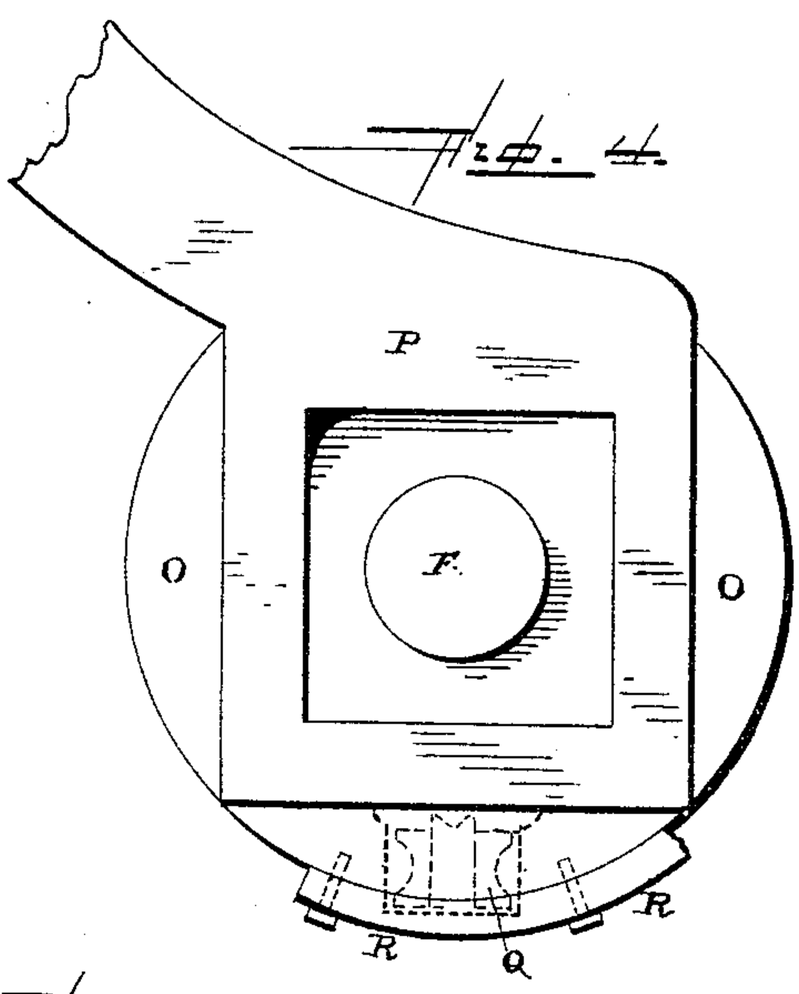
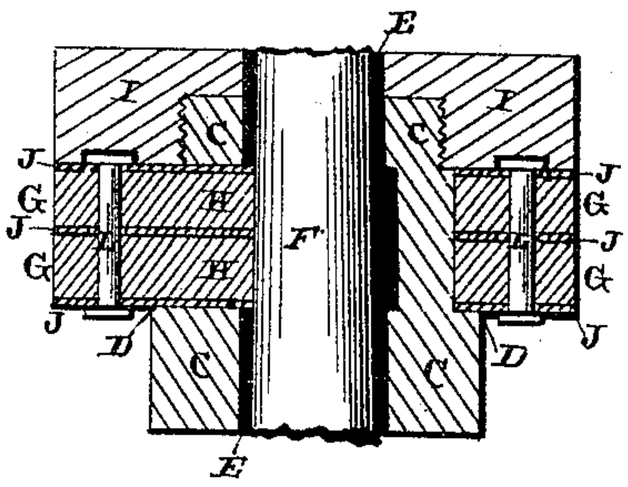


Fig. 5.



Witnesses.
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L. L. Burket

Inventor.
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per F. A. Lehmann, atty.

UNITED STATES PATENT OFFICE.

FREDERICK SULTER, OF CINCINNATI, OHIO.

TUBE-EXPANDER.

SPECIFICATION forming part of Letters Patent No. 328,622, dated October 20, 1885.

Application filed July 30, 1885. Serial No. 173,089. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK SULTER, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Tube-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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in tube-expanders; and it consists in the combination of a central perforated body upon which the movable sections or plates carrying friction-wheels are placed, a nut which clamps the movable sections or plates in position upon the body, and the expanding device, provided with suitable rollers, which is made to screw upon the end of the body, and the wedge or plug by means of which the plates or sections are forced outward against the inner side of the tube, as will be more fully described hereinafter.

Figure 1 is a vertical longitudinal section of a device embodying my invention. Figs. 2, 3, 4, and 5 are detail views of the same.

A represents the tube which is to have its end expanded, and B the head of the boiler or other similar device against which the end of the tube is to be expanded.

The body C, which is screw-threaded at each of its ends and provided with a shoulder, D, has an opening, E, made through its center for the plug F to pass through. Upon this body are placed; a series of circular plates or segments, G, each one of which has a projection, H, passing radially through an opening made in the side of the body C and projecting inward toward its center far enough for each projection H to be freely acted upon by the screw plug or wedge F when the plug or wedge is driven inward through the body C. These sections or segments G are held in position upon the body by means of the nut I, which is screwed upon the inner end of the body C, and which also has an opening through its center for the plug or wedge F to pass through. This nut I serves to clamp the segments or sections G against the shoulder D which is formed upon the body A, and thus prevent them from becoming displaced when the wedge or plug F is being used to force them outward on each side of these segments or sections G, and in between them are placed suitable thin plates, J, of any suitable construction, which help to keep the segments in position. Through each segment or section G are formed two slots, and through these slots are passed guide bolts or pins L, which serve to cause the segments to move outward when operated upon by the plug or wedge in a straight line. These pins L pass through both sets of sections G and through the plates J, and have the nuts or heads formed upon their outer ends recessed in a suitable groove which is made in the nut I. The opposite ends of the pins will have a thin flat head made upon them, so as to take up as little room as possible. Each one of the segments or sections G is provided with a friction roller or wheel, N, at its center, and this wheel N bears against the inner side of the tube A. When the sections are expanded or forced outward by the plug F, these friction-rollers are forced against the inner sides of the tube; but no other part or portion of the segments comes in contact with the tube. One set of segments is provided with small rollers N, and the other set with larger ones, as shown in Figs. 2 and 3. The pivotal points or pins upon which the rollers turn are placed at different distances from the edges of the segments, proportioned to the size of the rollers or wheels that are used. Different-sized wheels are used, because the plug F is made tapering, and it would not act upon both sets of sections or segments alike unless some special provision were made for the tapering of the plug.

Screwed upon the outer end of the body C is the expanding device O, which has a recess made in its inner end to receive the screw-thread upon the body C, and which has its outer end made angular, as shown in Fig. 4, so as to have the wrench P or other similar device applied to it for the purpose of causing it to revolve. There is made through the center of this expanding device O a suitable opening through which the plug or wedge F passes. This expanding device O is provided with a suitable number of grooved

expanding-rollers, Q, which catch over the edge of the tube A and expand it as expanding-tube O is screwed upon the body A. These rollers Q may either be made to extend horizontally or be placed at an angle, as may be preferred.

As shown in Fig. 4, one of the bearings for the journals upon which the rollers turn may be made in a separate and distinct plate, R, which is bolted to the outer side of the part O. I do not limit myself to any details of construction in this respect, for the manner of attaching the rollers may be varied at will without departing from the spirit of my invention

After the body C has been placed in position and the segments G expanded by driving in the plug F through the body and between the inner ends of the projections H, until the body is held rigidly in position by the frictional contact of the rollers N against the inner side of the tube, then the expanding device O is applied to the outer end of the body, or the whole of the device may be placed in position at the same time.

After the plug F has been driven in so as to hold the segments in position the expanding device O is screwed up upon the body A toward the end of the tube which is to be expanded, and the rollers Q then expand the end of the tube, as shown.

Having thus described my invention, I claim—

1. The combination of the perforated body A, the segments which are applied thereto, and provided with projections H and friction-rollers N, with the plug, which is forced through the body and in between the projections H, substantially as shown.

2. The combination of the body A, the segments G, applied thereto, the guiding-pins which pass through the segments, the nut which holds the segments in position, and the plug F, each section being provided with slots for the pins to pass through, with projections which pass through the body A, and with friction-rollers to catch against the inner side of the tube, substantially as described.

3. The combination of the body A, the segments G, applied thereto, the nut I, and the expanding device O, provided with rollers, the segments being provided with projections H and friction-rollers, substantially as set forth.

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

FREDERICK SULTER.

Witnesses:
CHAS. PHARES,
JOSEPH BRACKMAN.