

No. 616,109.

Patented Dec. 20, 1898.

C. E. KELLY & A. J. HAWORTH.  
TOOL FOR REPAIRING ELASTIC TUBING.

(Application filed Sept. 2, 1897.)

(No Model.)

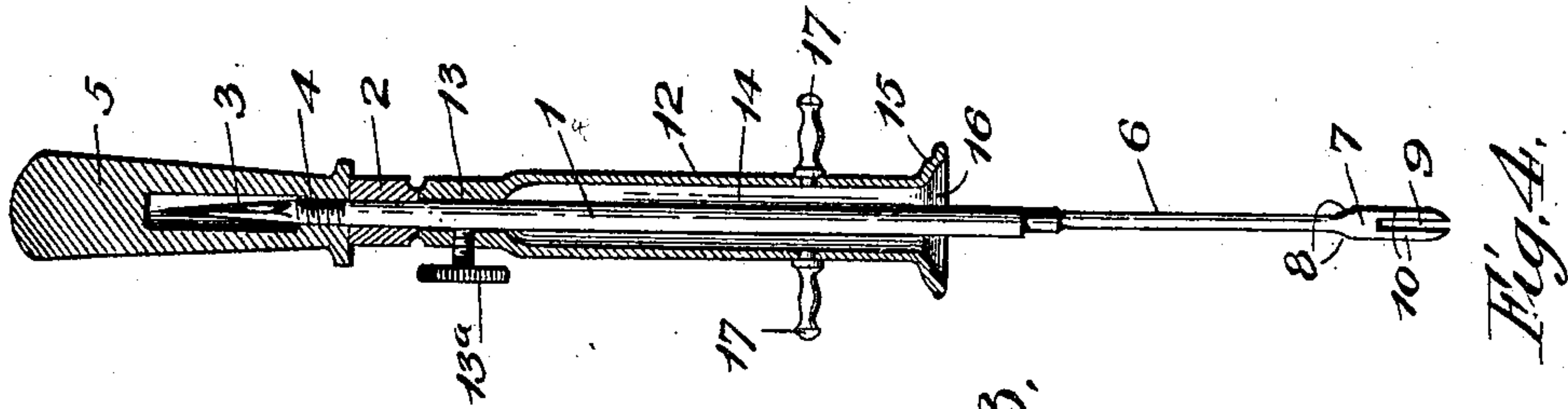


Fig. 4.

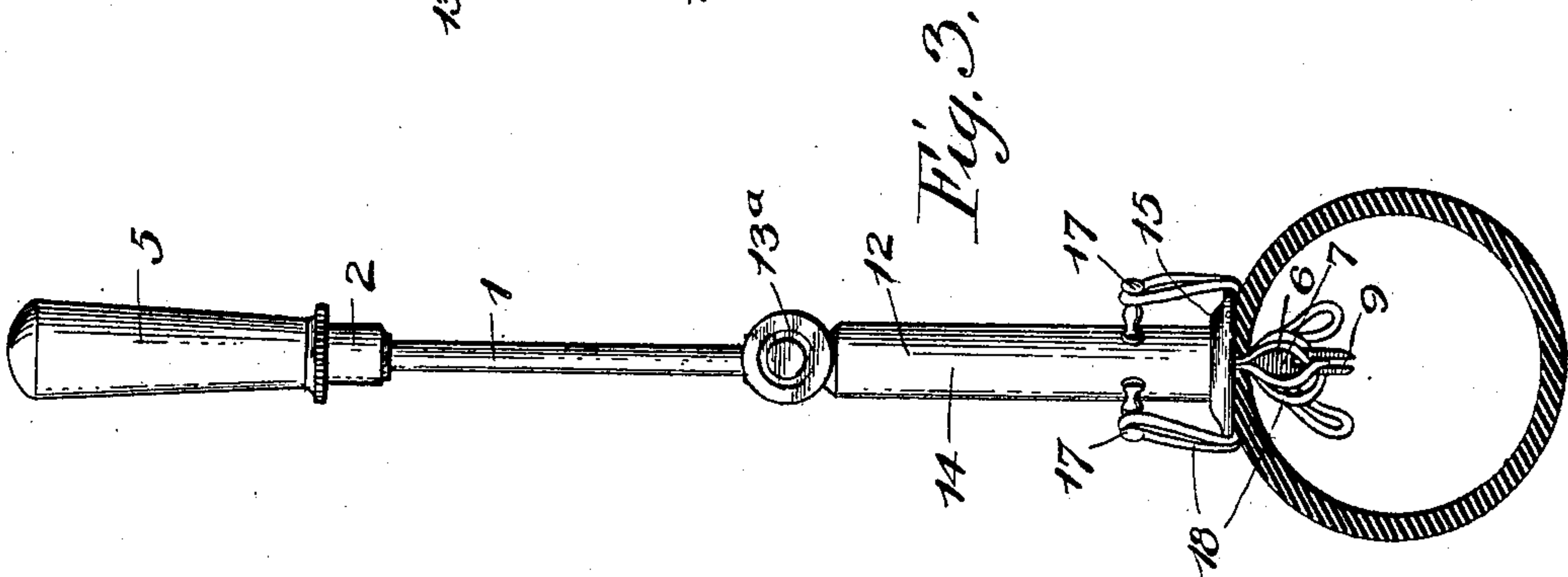


Fig. 3.

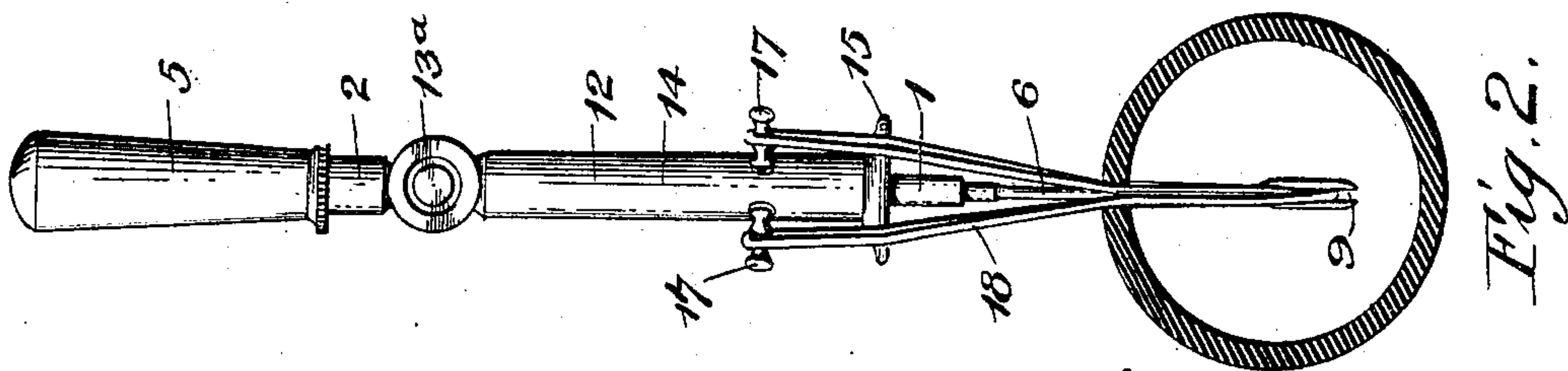


Fig. 2.

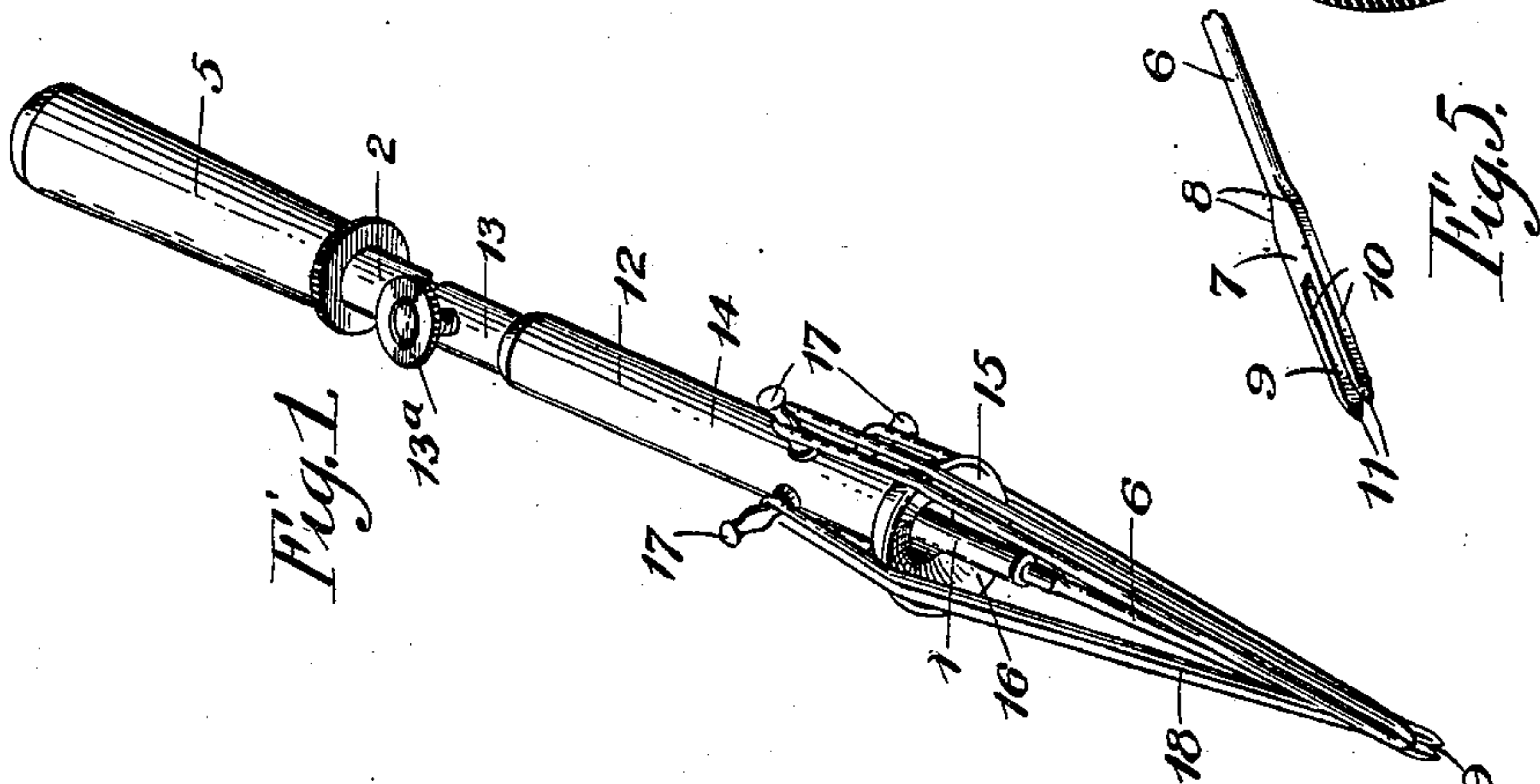


Fig. 1.

Fig. 5.

Witnesses

J. Grant Culverwell,  
Edwin Cruise.

By their Attorneys,

Inventors  
Clarence E. Kelly and  
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# UNITED STATES PATENT OFFICE.

CLARENCE E. KELLY AND AMANDA J. HAWORTH, OF GREENTOWN,  
INDIANA.

## TOOL FOR REPAIRING ELASTIC TUBING.

SPECIFICATION forming part of Letters Patent No. 616,109, dated December 20, 1898.

Application filed September 2, 1897. Serial No. 650,342. (No model.)

*To all whom it may concern:*

Be it known that we, CLARENCE E. KELLY and AMANDA J. HAWORTH, citizens of the United States, residing at Greentown, in the county of Howard and State of Indiana, have invented a new and useful Tool for Repairing Elastic Tubing, of which the following is a specification.

This invention relates to repairing-tools for inflatable tubes, such as bicycle-tires and the like; and it has for its object to provide, in connection with a shaft carrying puncture-closing devices, a puncture-enlarging awl which when not in use is designed to be housed entirely within the handle of the tube, thereby combining in one structure every device necessary for the proper repairing of the punctured tube.

With this object in view the invention consists of the several details of construction and combination of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of our improved tube-repairing tool ready for use. Fig. 2 is a sectional view of a tube, showing the elastic material inserted in the puncture and the tool ready for withdrawal. Fig. 3 is a similar view showing the needle disengaging itself from the elastic strips. Fig. 4 is a longitudinal section of the tool. Fig. 5 is an enlarged detail view of the slotted and pointed end of the needle.

Similar reference-numerals indicate similar parts in all the figures of the drawings.

1 indicates a shaft, which, as shown in the drawings, is tubular, but may be solid, and 2 indicates a collar secured at the upper end of the shaft.

3 indicates an awl, the stabbing portion of which will preferably be angular in cross-section and the shank 4 of which is threaded.

5 indicates a handle to fit over the awl and be screwed onto the threaded shank thereof.

6 indicates the needle secured in any suitable manner to the lower end of the shaft either permanently or detachably. The body of the needle is cylindrical and its lower end flattened, as indicated at 7, and the shoulders at the junction of the flattened end portion

with the cylindrical portion of the body will be inclined, as indicated at 8. The flattened portion of the needle is provided with an open-ended slot 9, extending longitudinally thereof and midway between its side edges, and the arms 10 on each side of the slot are pointed at their ends, as indicated at 11.

12 indicates a sleeve, the bore of which is reduced at its upper end, as indicated at 13, to fit snugly on the shaft 1 to permit free sliding movement. The reduced portion of the bore is of sufficient length to support the sleeve on the shaft concentric therewith, and the sleeve will be locked on the shaft in its adjusted position by a set-screw 13<sup>a</sup>. The other portion of the bore (indicated by 14) is of greater diameter than the shaft.

15 indicates a plate or disk centrally perforated and secured on the lower end of the sleeve, and the lower face 16 of this plate is dish or concaved to make the entrance into the lower end of the sleeve bell-shaped or flaring.

17 indicates pins, preferably four, although there may be more or less, as preferred, which are secured to the sleeve and radiate therefrom a short distance from its lower end.

18 indicates elastic strips, which are preferably in the form of rubber bands, detachably secured in the open-ended slot 9 and on the pins 17. If long bands are used, they will preferably be inserted midway their length in the slot 9 and have their ends secured over the respective pins 17. We do not, however, limit our invention to the use of rubber bands, as other elastic material may be used and detachably supported in the slot 9 and by the pins 17 in any manner preferred.

In operation the strips of elastic material will be detachably secured in position on the tool and the needle be forced through the puncture or opening, which may be previously enlarged, if necessary, by the awl which is provided for this purpose, and the strips of elastic material will be drawn through the opening with the needle. The needle should be pushed into the interior of the tube a considerable distance, and the strips of elastic material will become more or less stretched in the tube. When the strips have been inserted in the tube a sufficient distance, the



set-screw 13<sup>a</sup> will be loosened and the sleeve moved down over the shaft and the strips of elastic material disengaged from the pins 17. The concaved plate is then forced against the tube and the shaft and needle moved outwardly from the tube, and as the elastic strips begin to contract within the tube they will bunch up around the puncture and offer sufficient resistance to permit the slotted end of the needle to disengage itself from them, and when the needle is withdrawn the opening will contract and the strips will expand, and thereby effectually close the opening or puncture and prevent leakage. The inclined shoulders 8 will greatly facilitate the withdrawal of the flattened end of the needle without dragging the strips with it, and the concaved face of the disk 15 will also aid in the withdrawal, as it permits the tube to stretch outwardly to a limited extent around the puncture or opening, which has the effect of slightly stretching such opening.

Preferably the strips of elastic material will be wet with a suitable rubber solution or cement; but this is not at all times absolutely essential. Our invention will be particularly useful to stop up punctures in pneumatic tires used on bicycles or other vehicles, and it will also be useful to stop small punctures or openings in elastic hose used for conveying water or other fluid.

While the complete repairing-tool has been fully described, we lay no claim herein to the puncture-closing devices carried by the shaft, as such devices form the subject-matter of a sole application about to be filed by Clarence

E. Kelly, one of the present applicants; but what we do claim in this application as new and original is the combination of a shaft carrying puncture-closing devices and a puncture-enlarging awl fitted to one end of the shaft and housed within a detachable handle.

It is to be understood that changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what we claim as new is—

1. In a repair-tool of the class described, the combination of a shaft carrying puncture-closing devices, a puncture-enlarging awl fitted to one end of the shaft, and a hollow handle removably fitted over and housing the awl, substantially as described.

2. In a tool for repairing elastic tubing, the combination of a shaft, an awl secured to one end of the shaft, a handle removably fitted over the awl, a needle having an open-ended slot in its pointed end, and a sleeve slidably supported on the shaft and provided with a series of radiating pins, substantially as and for the purposes described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

CLARENCE E. KELLY.  
AMANDA J. HAWORTH.

Witnesses:

LISBON J. HAWORTH,  
MORRIS HAWORTH.