

No. 844,215.

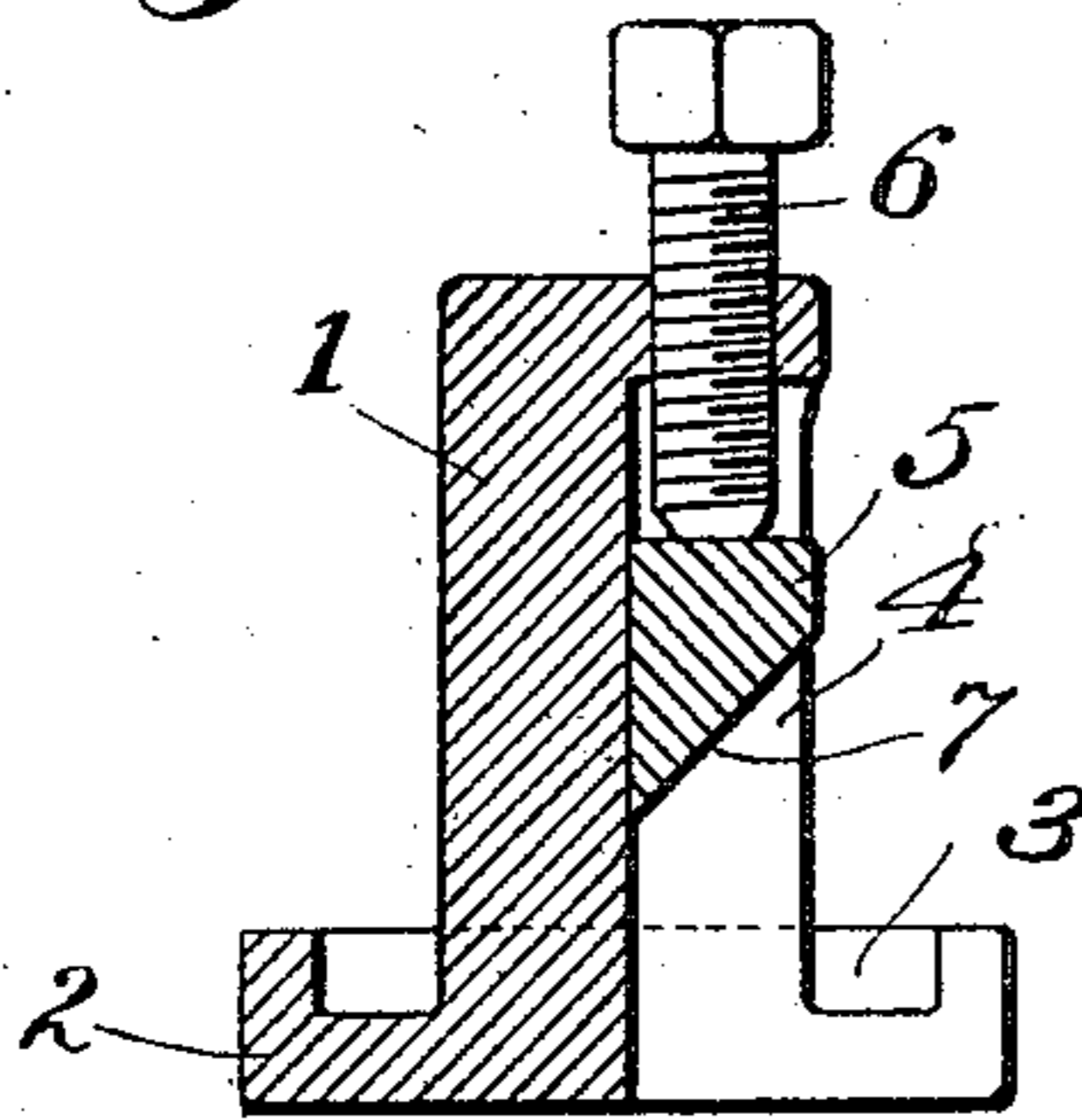
PATENTED FEB. 12, 1907.

A. B. TODD & F. W. SHUPERT.

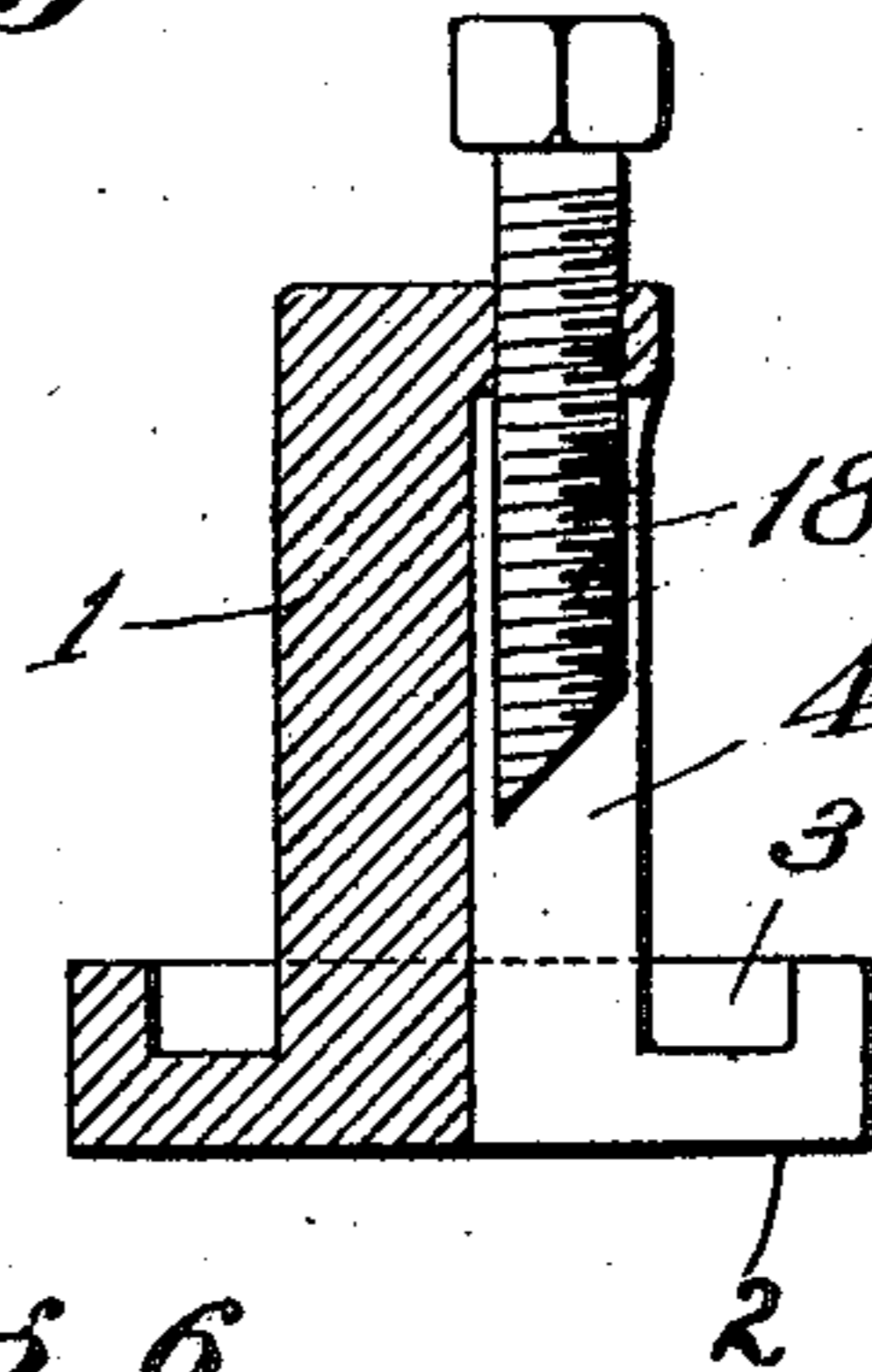
TOOL AND HOLDER FOR ROLLING, EXPANDING, AND BEADING BOILER TUBES  
IN ONE OPERATION.

APPLICATION FILED MAY 14, 1906.

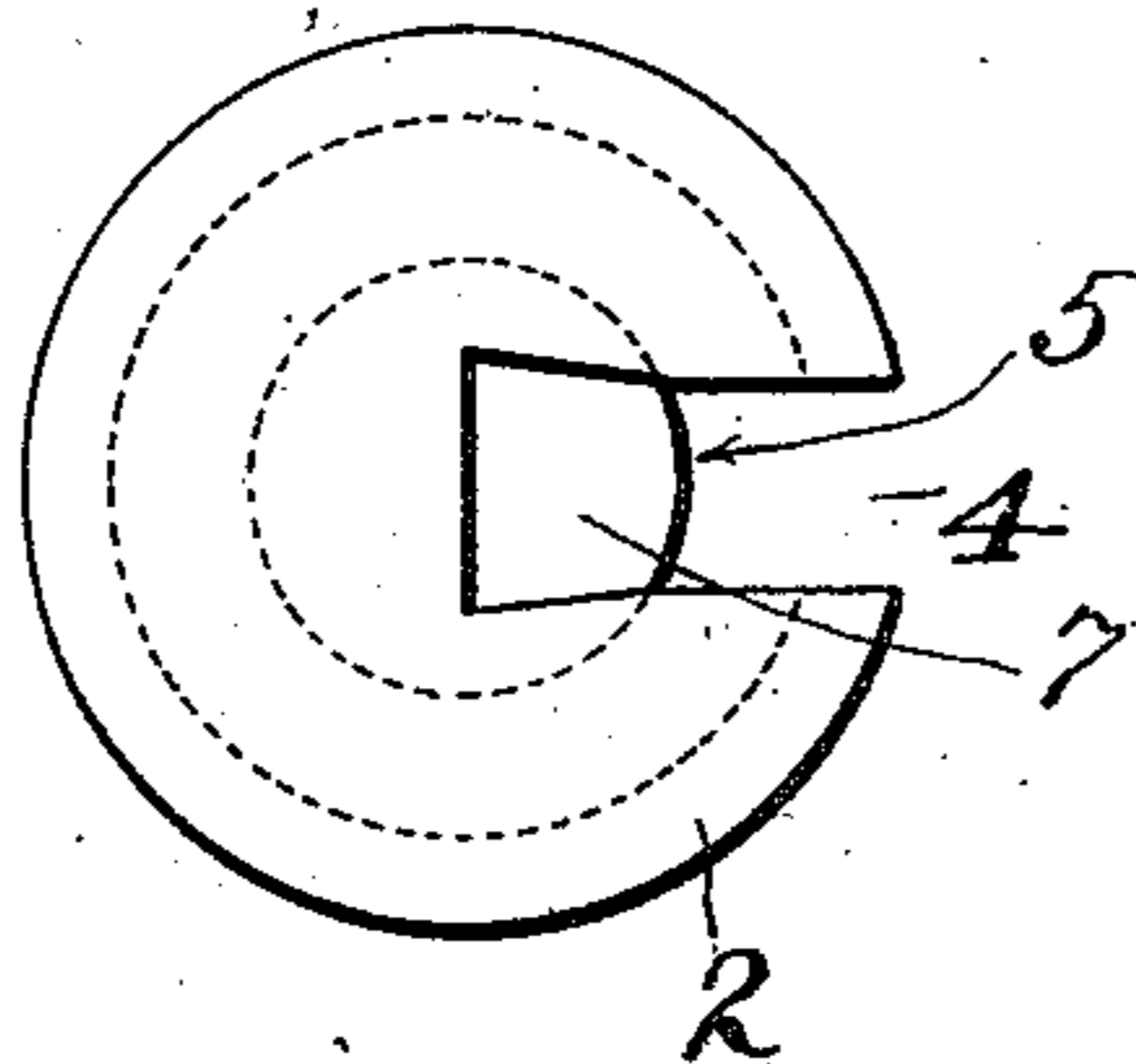
*Fig. 1.*



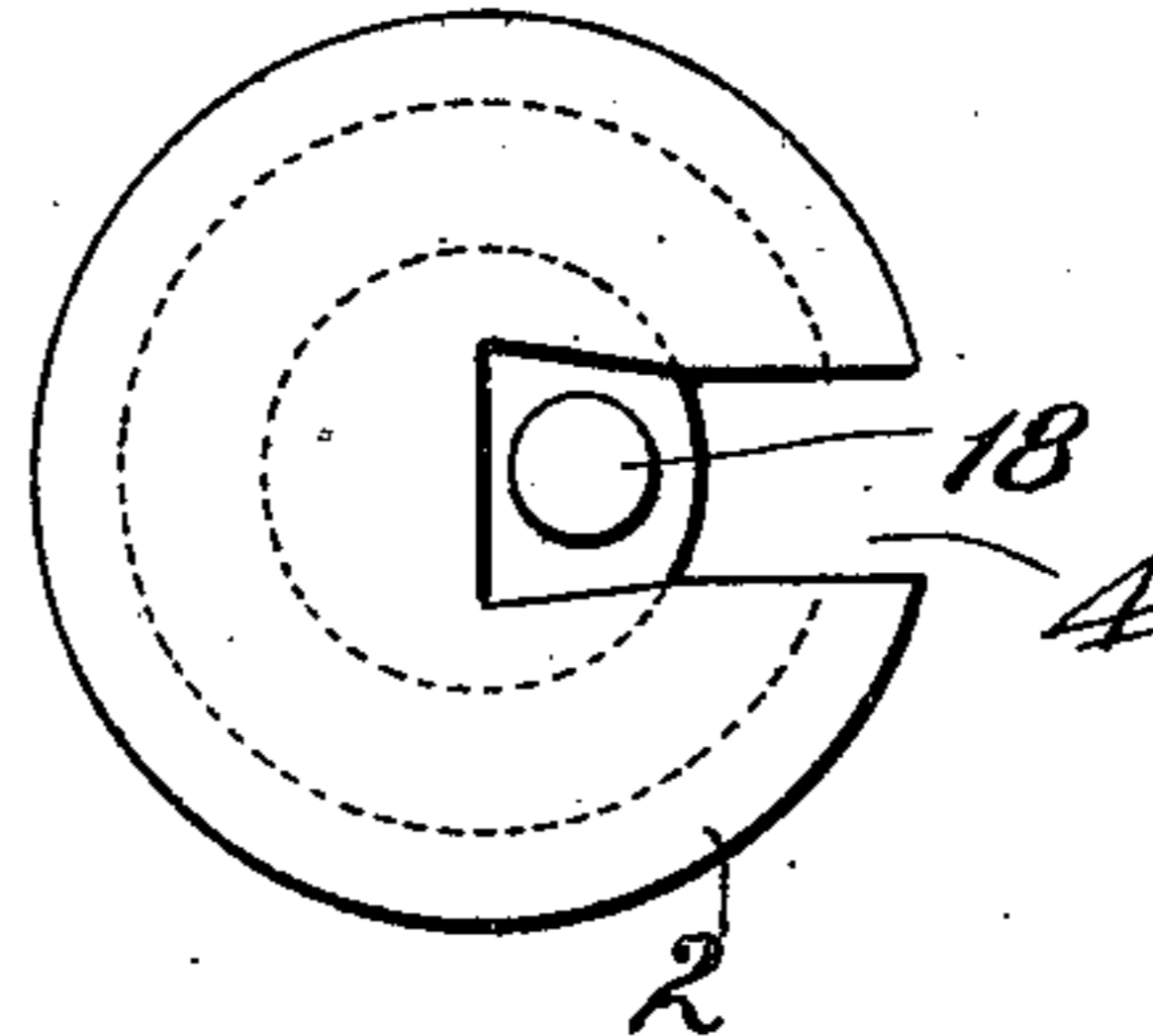
*Fig. 5.*



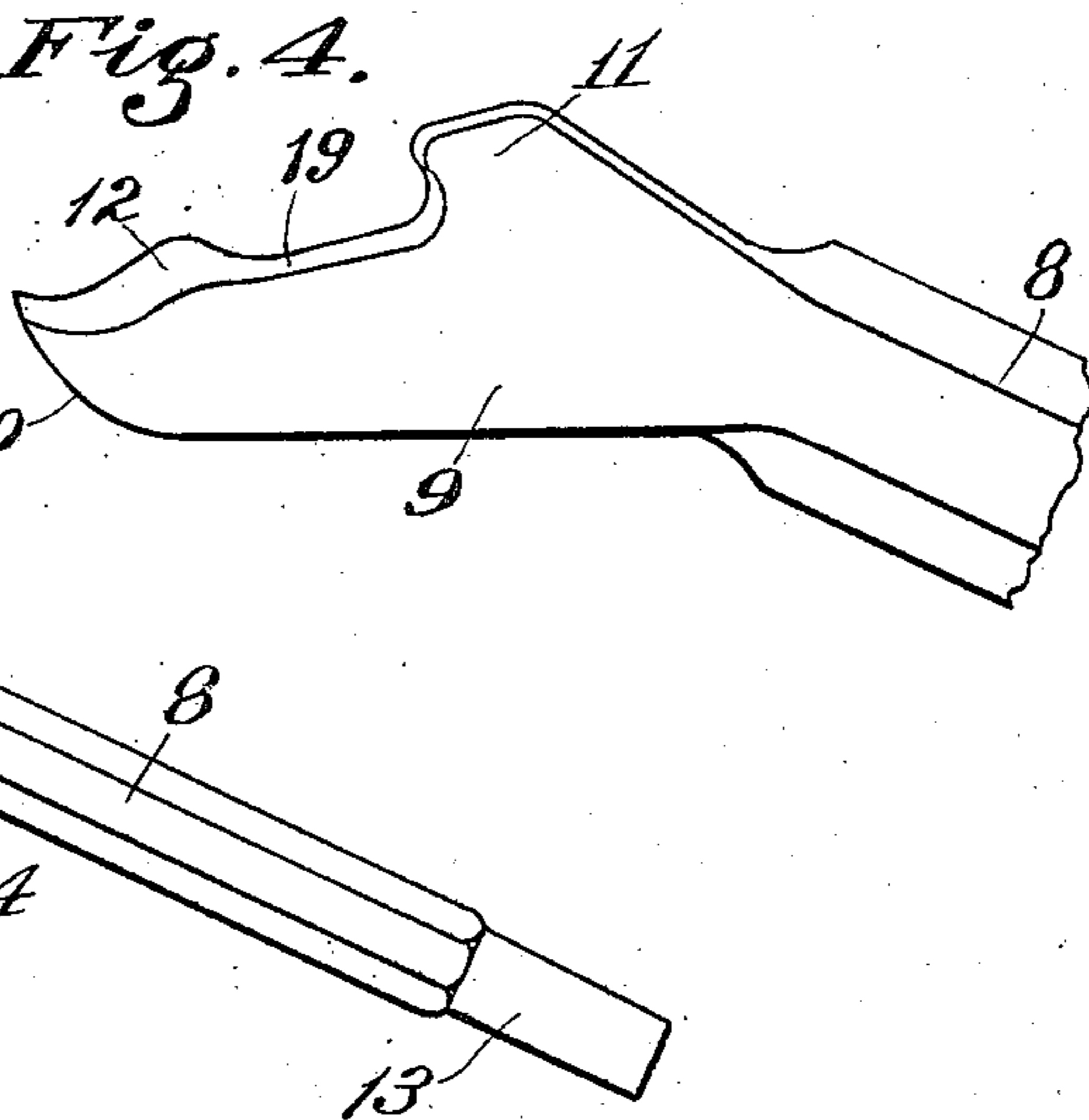
*Fig. 2.*



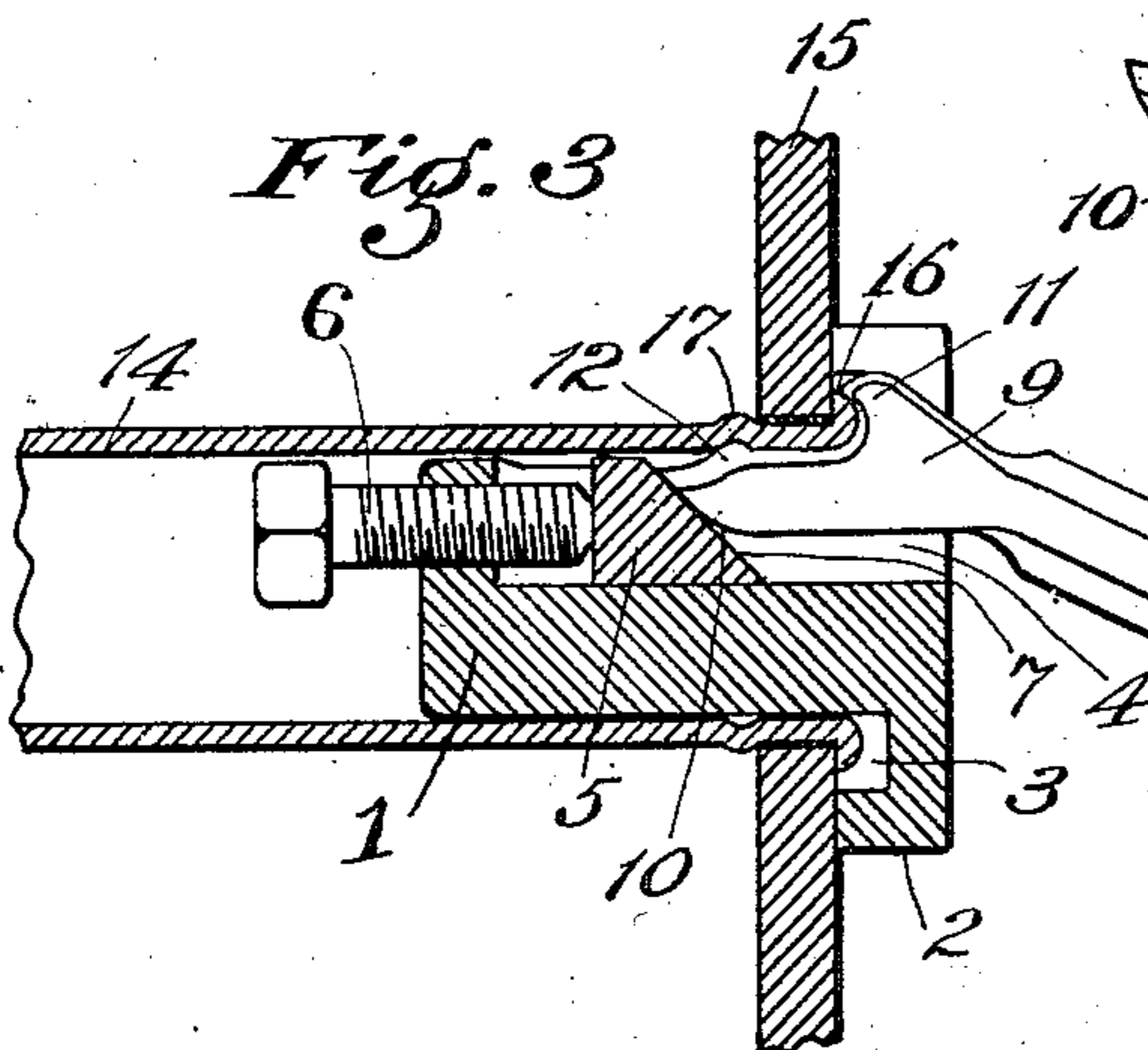
*Fig. 6.*



*Fig. 4.*



*Fig. 3.*



*Witnesses:*

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*by James A. Townsend*  
*his atty.*

# UNITED STATES PATENT OFFICE.

ALEXANDER B. TODD AND FRANK W. SHUPERT, OF SAN BERNARDINO,  
CALIFORNIA.

TOOL AND HOLDER FOR ROLLING, EXPANDING, AND BEADING BOILER-TUBES IN ONE OPERATION.

No. 844,215.

Specification of Letters Patent.

Patented Feb. 12, 1907.

Application filed May 14, 1906. Serial No. 316,610.

*To all whom it may concern:*

Be it known that we, ALEXANDER B. TODD and FRANK W. SHUPERT, both citizens of the United States, residing at San Bernardino, in the county of San Bernardino and State of California, have invented a new and useful Tool and Holder for Rolling, Expanding, and Beading Boiler-Tubes in One Operation, of which the following is a specification.

This invention relates to an improved tool and holder therefor for rolling, expanding, and beading boiler-tubes in a single operation.

The method of accomplishing this end has hitherto required three separate operations, as well as individual tools, for each operation, involving not only an excess amount of labor, but a great expenditure of time.

The object of this invention is to obviate these disadvantages and to accomplish the rolling, expanding, and beading of the boiler-tubes in a single continuous operation.

When the boiler-tubes have been placed in position and extend through the tube-sheet thereof, the projecting ends of the tubes are provided with beads, which beads lie flush, or nearly so, with the tube-sheet. The portion of the tubes approximating the inner side of the tube-sheet is expanded, and it, together with the beaded portion, forms a support, as well as a clamp, for the tubes. To do this, it has always been necessary to resort to separate operations; but with the tool we are about to describe this method may be accomplished in a single operation, whereby a bead, as well as the expansion of the tube, is formed with equal perfection, but much more readily and easily than has been the case heretofore.

With these and other objects in view this invention consists in features, details of construction, and combination of parts, as will be described in connection with the accompanying drawings and then be more particularly pointed out in the claims.

In the drawings, Figure 1 represents a vertical section of a part of the tool; Fig. 2, a bottom plan view thereof; Fig. 3, a vertical longitudinal section illustrating the tool in operation; Fig. 4, a fragmentary detail of the head of the tool member; Fig. 5, a vertical section of a modification, and Fig. 6 a bottom plan view thereof.

Referring more in detail to the drawings, 1 represents the tool holder or guide, having

integral therewith a base 2, provided with a rabbeted or countersunk portion 3. The said holder is provided with a vertical slot 4, which slot extends through the base, as well as through the portion 1. A block 5 is slidably placed or located within said slot and is operated vertically with respect to said portion 1 by means of a screw 6, whose shank portion extends through the uppermost part of the portion 1 of the tool-holder. The walls of said slotted portion 4 are tapered and the block slidable therein so constructed as to conform therewith, the purpose of this arrangement being to prevent the accidental escape of said block from its guide 4. The lower portion of said block 5 is provided with an abrupt incline, as shown at 7, the purport of which will be described hereinafter.

Coacting with said tool-holder is a tool 8, having a shank portion and a head 9, said head extending away at an angle to the shank portion of the tool. Said head 9 is of a shape corresponding with the slot in the holder 1, wherein it is arranged to slide. Its extremity 10 is rotund or curved, the angle of said curve being equal to the angle of the block 5, but reversed.

One edge of the angular head 9 is provided with a projection 11 and forms an abutment arranged to impinge against the projecting end of the tube. A similar projection 12 is likewise formed on the edge of said head 9 for the purpose of expanding the metal of the tube, and the shank portion 8 has a stem 13 arranged to fit in a stock or gun of a pneumatic hammer. (Not shown.)

The action of a pneumatic hammer or any other power-operated device is not necessary in connection with the actuation of this tool, since a hammer will answer the purpose as well.

The rotund or curved portion 10 of the tool-head 9, as before stated, abuts against the inclined adjusting-block 6, and as the impetus is exerted against the stem 13 of the shank portion of the tool it is forced upwardly and outwardly from said slot as far as the tapered walls thereof will permit. The walls of the headed portion of the tool 9 are likewise tapered; but the taper is such as to allow the free operation of the tool within the slotted portion 4 of the holder to accomplish its function.

In Fig. 3 of the drawings, 14 represents a

part of a tube whose end projects through the tube-sheet 15. The tool-head 9 has beaded the end of the tube, as seen at 16, and the metal expanded, as shown at 17, by the projection 12. In this illustration it will be seen that as the force is applied to the shank portion of the tool the sliding block will cause the head of the tool to move away therefrom and allow the force of the projection 12 to be exerted against the side of the tube, thus expanding the same.

The rabbeted portion 3 is designed to accommodate the bead. It is obvious that as the tool is operated it is given a circular motion whereby a circular bead is formed, the base of the holder serving to guide the bead-forming projection 11 of the tool-head 9.

If desired, the sliding block may comprise a set-screw whose bottom portion is angled, as shown in a modification of Fig. 5 at 18.

The portion 19 of the tool-head 9 is arranged to roll the intermediate portion of the metal between the bead 16 and the expanded portion 17, which operation is accomplished in the same process as said beading and expanding. In this manner the metal is left in perfectly smooth condition and the bead formed without breakage as the tool travels circularly around the end of the pipe.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. A tool comprising a bead-forming and metal-expanding member, a guide therefor composed of a body portion having a base, a slot common to both body portion and base, said base being rabbeted and arranged to accommodate the bead, and an adjustable abutting surface slidable in said slot for maintaining a normal outward thrust of said member.

2. The combination with a tool having a plurality of projections formed thereon, and a holder, of adjustable means for imparting an outward thrust to said tool, and means for preventing the lateral withdrawal of said tool.

3. A beading-tool comprising a cylindrical body portion having a rabbeted base arranged to accommodate the bead and a lateral tapering slot common to both body portion and base, and a separable tool-head operable in said slot, and arranged to expand and bead a flue into which the body portion is inserted.

4. A tool comprising a base having a rabbet and a cylindrical body portion having a slot, said slot extending through one side thereof, a tool-head having projections operable in said slot, and means in said slot for maintaining an outward thrust of said tool in the direction of the free end of said slot.

5. A tool comprising a body portion and a rabbeted base having a tapering lateral slot common to both body portion and base, a tool-head having extensions operable in said slot and conforming to the taper thereof,

means in said slot for maintaining an outward thrust of said tool-head, and means for controlling said means.

6. A tool comprising a bead-forming and metal-expanding member, a guide therefor comprising a slotted cylindrical portion having a rabbeted base, means for preventing the lateral withdrawal of said tool, and adjustable means for imparting a lateral thrust to said member.

7. A tool comprising a bead-forming and metal-expanding member, a guide therefor composed of a body portion having a base and a tapering slot common to both body portion and base, said base being rabbeted and arranged to accommodate the bead.

8. A tool comprising a bead-forming and metal-expanding member, a guide therefor composed of a body portion having a base, a slot common to both body portion and base, said base being rabbeted and arranged to accommodate the bead, and means slidable in said slot for maintaining a normal outward thrust of said member.

9. A tool comprising a cylindrical body and a base, having in common a slot on one side thereof, a block slidable in said slot and means for operating said block, and a tool-head operable in said slot and arranged to abut against said block.

10. A tool comprising a cylindrical body and a base having in common a tapering groove, a block loosely fitting said slot, means for operating said block, and a beading-tool operable in said slot and arranged to abut against said block.

11. A tool comprising a cylindrical body and a base having in common a tapering groove, a block having a corresponding taper with that of said cylindrical body and an inclined face, operable in said slot, means for operating said block, and a tool-head operable in said slot and arranged to abut against said block.

12. A tool comprising a body portion having a groove, a block in said groove, means for operating said block, and a tool-head operable in said groove and against said block.

13. A tool comprising a body adapted to enter into a flue having a groove in one side thereof and a base, a block slidable in said groove, and a tool-head operable in said groove and against said block.

14. A tool comprising a body portion having a lateral groove which is tapered, a block slidable in said groove, and a tool-head operable against said block and in said groove.

In testimony whereof we have hereunto set our hands, at San Bernardino, California, this 7th day of May, 1906.

ALEXANDER B. TODD.

FRANK W. SHUPERT.

In presence of—

F. D. DRAPER,

A. G. KENDALL.