

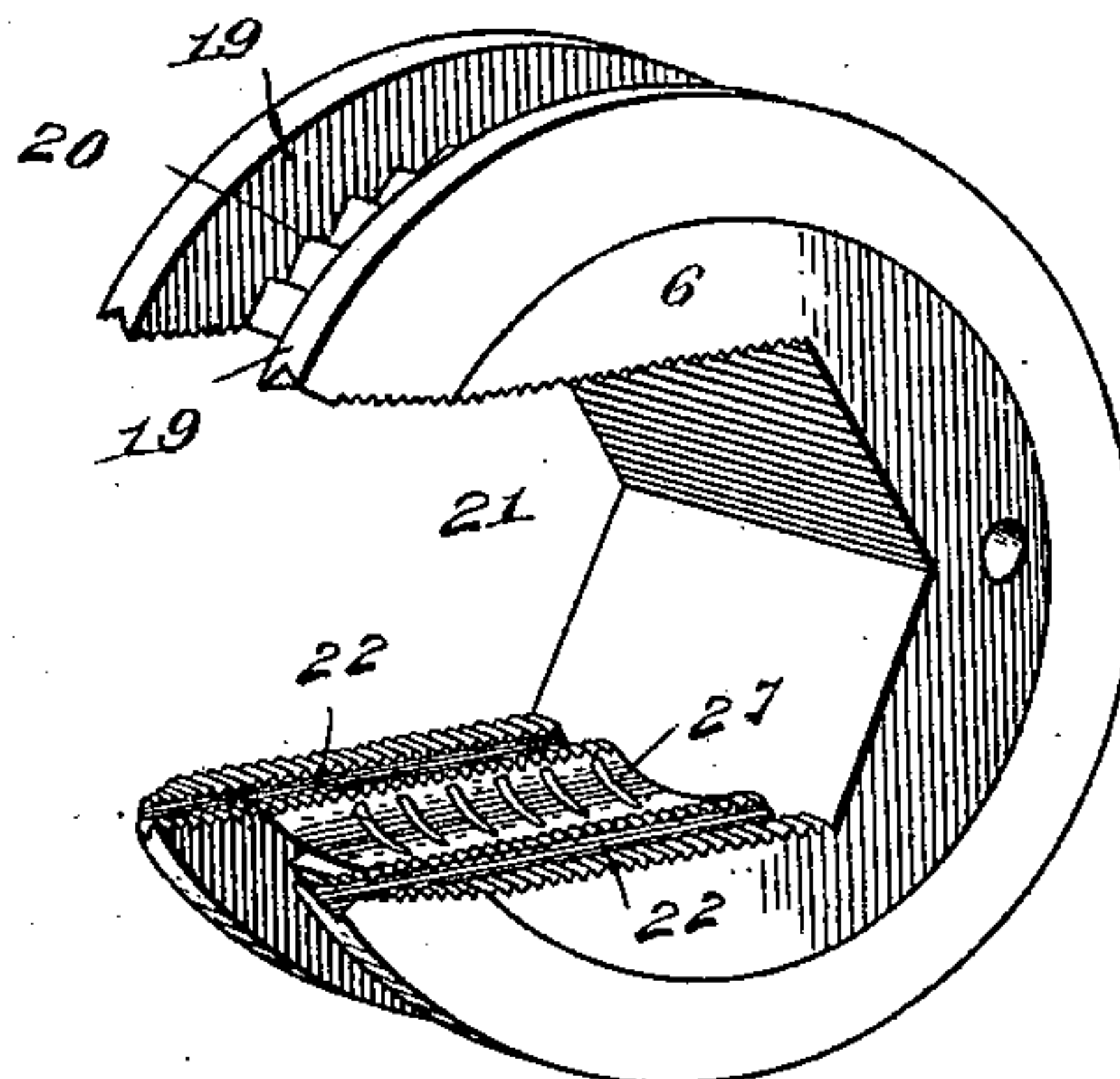
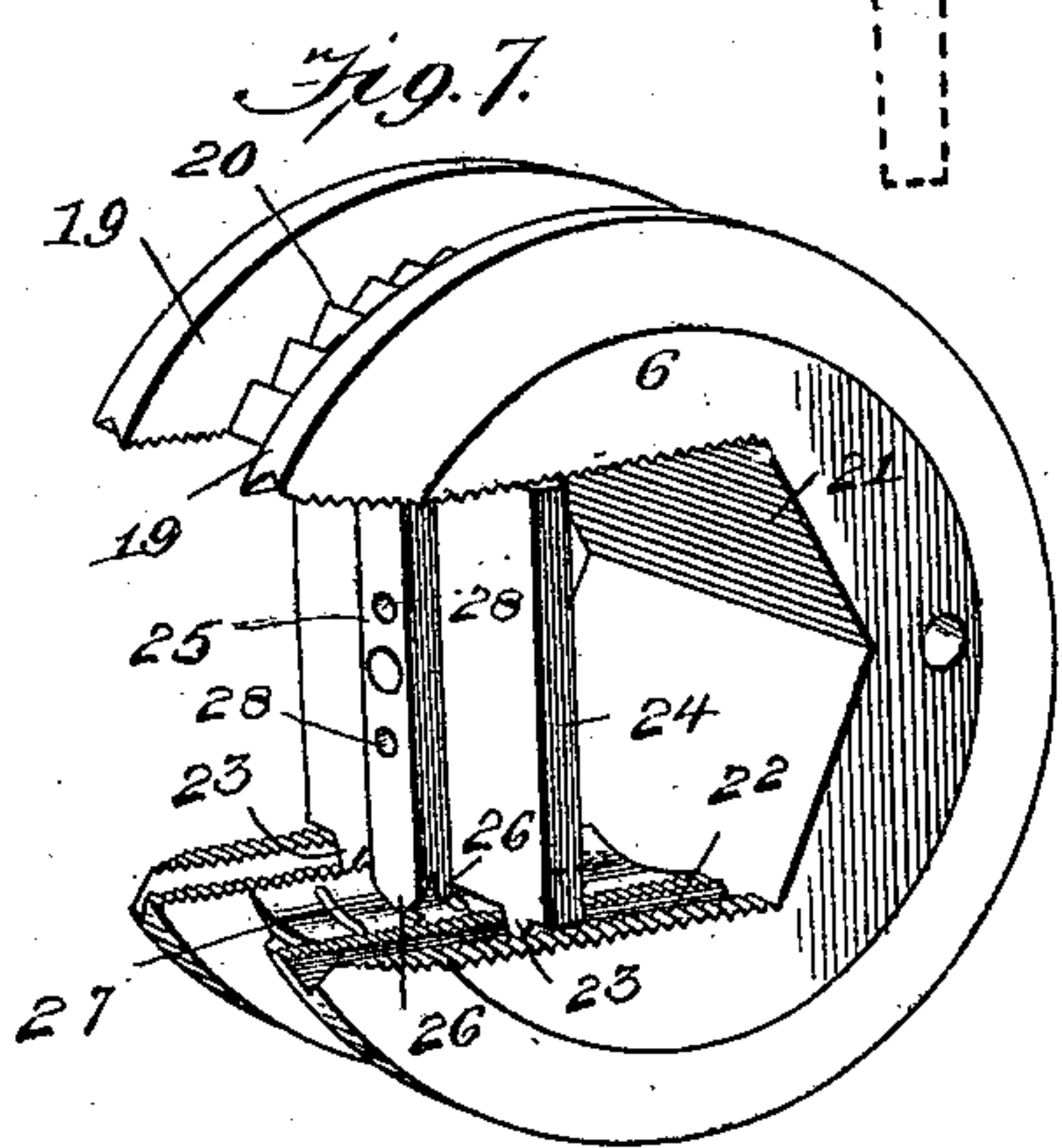
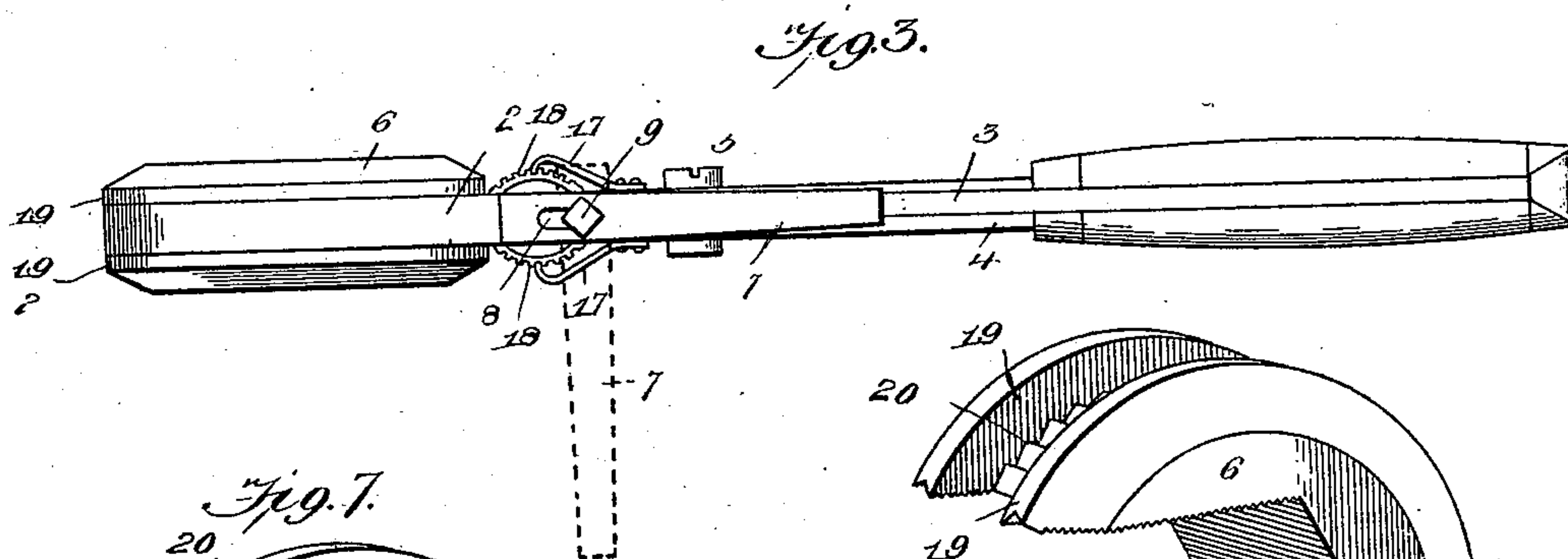
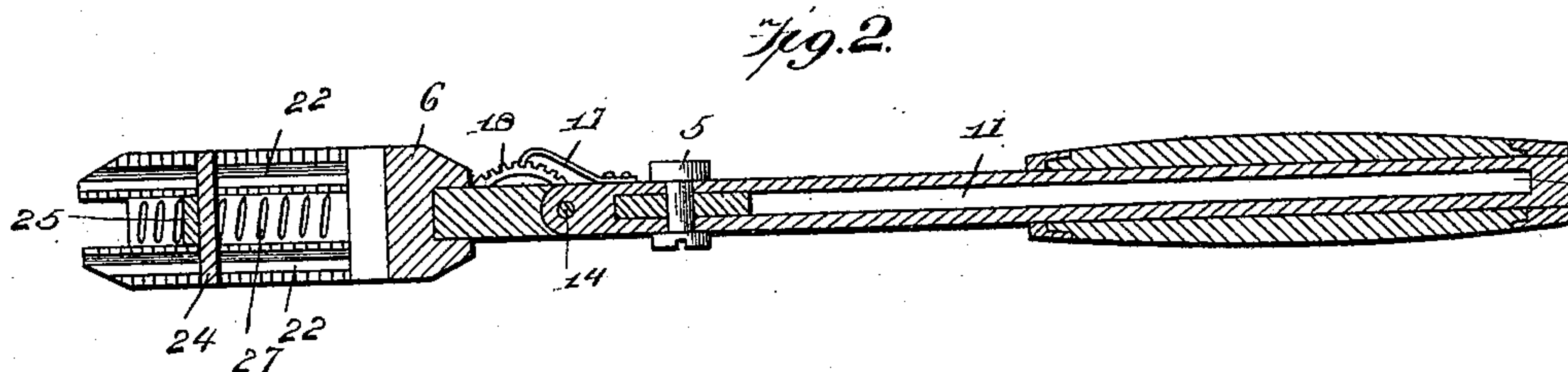
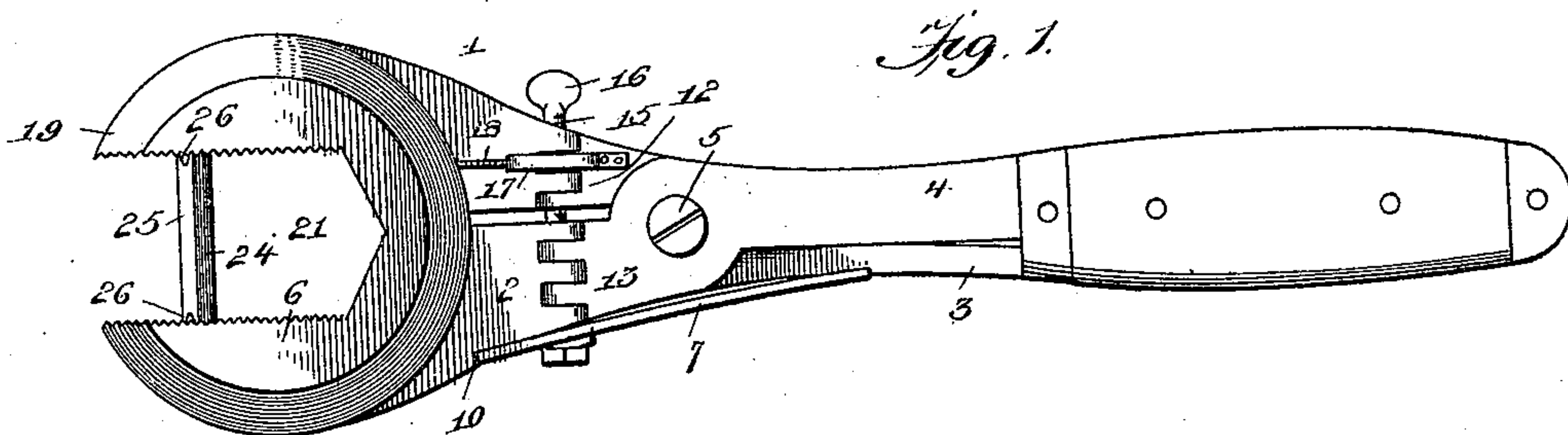
(No Model.)

2 Sheets—Sheet 1.

G. F. JOHNSON.  
WRENCH.

No. 556,151.

Patented Mar. 10, 1896.



Witnesses

*John C. Shaw.*  
*[Signature]*

By *W. S.* Attorneys.

*Gustaf F. Johnson,*

*CA Snow & Co.*

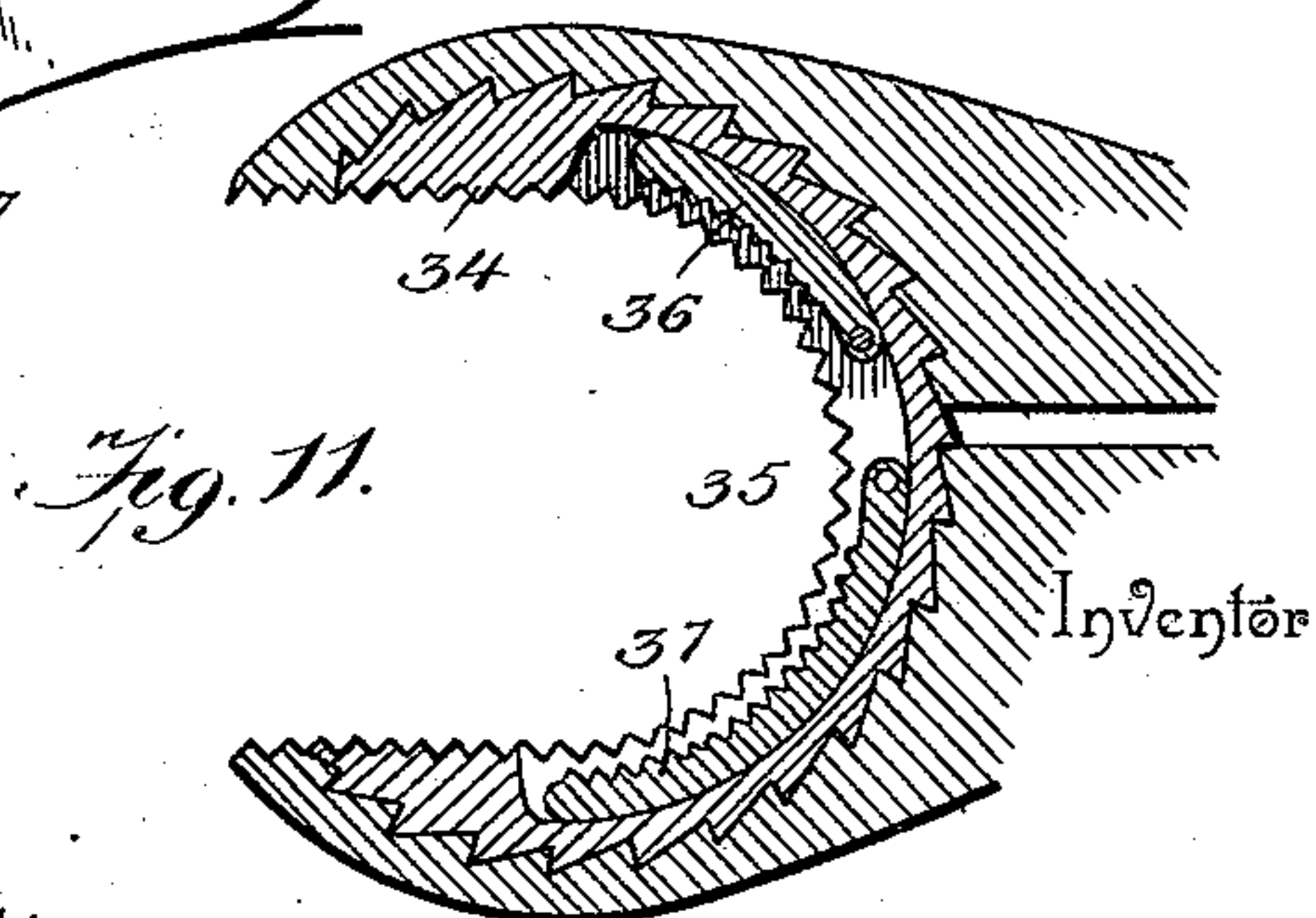
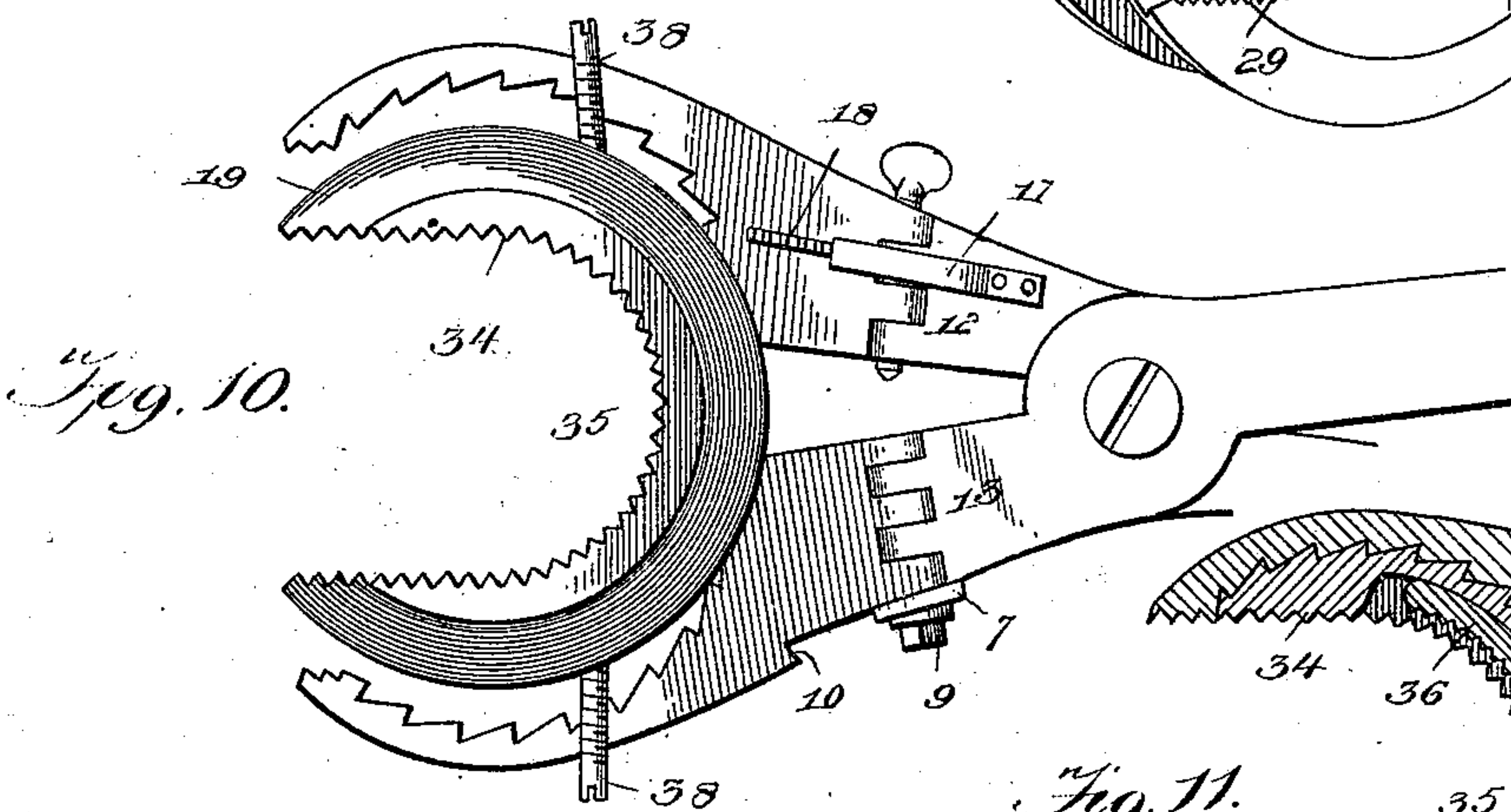
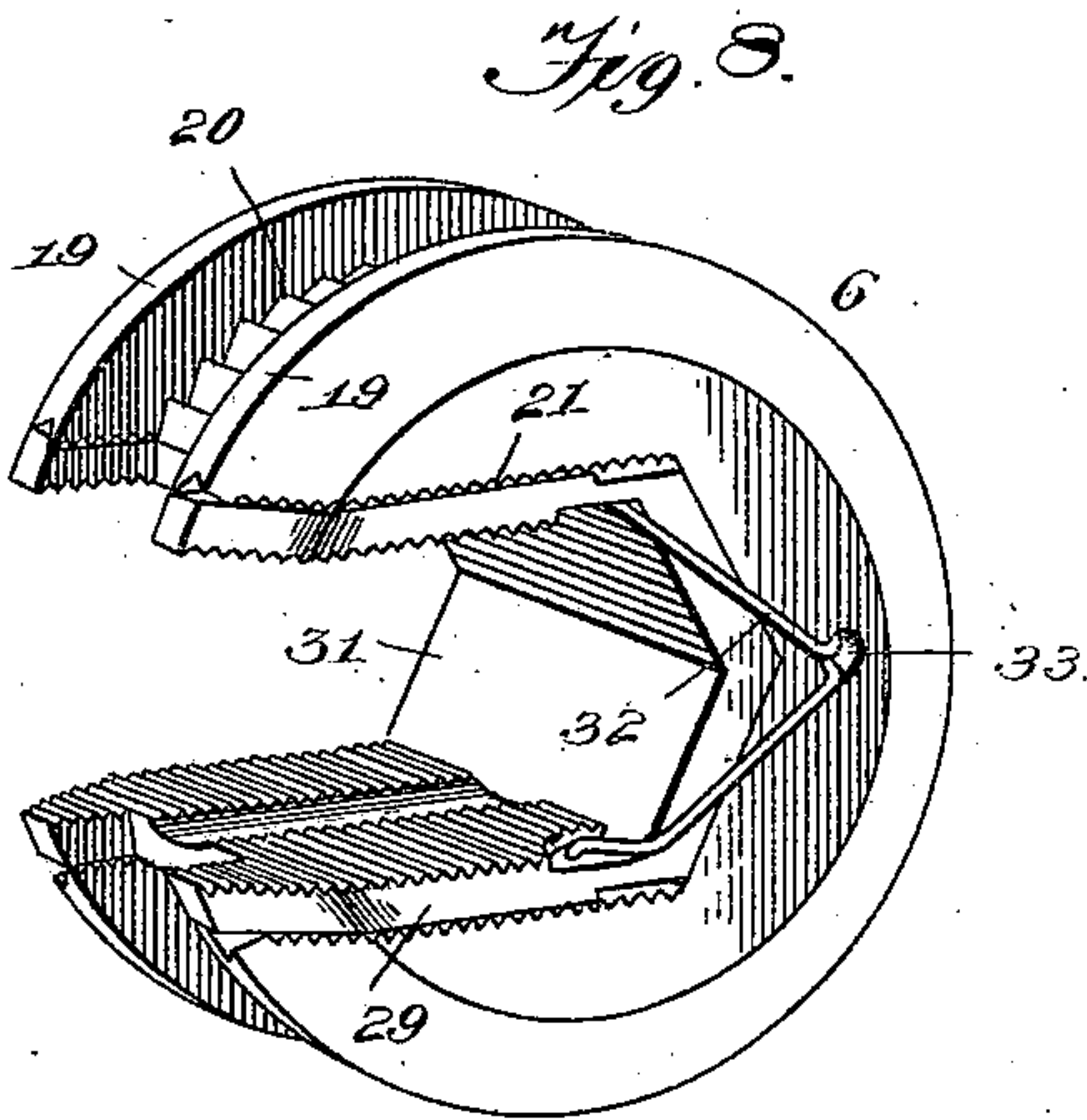
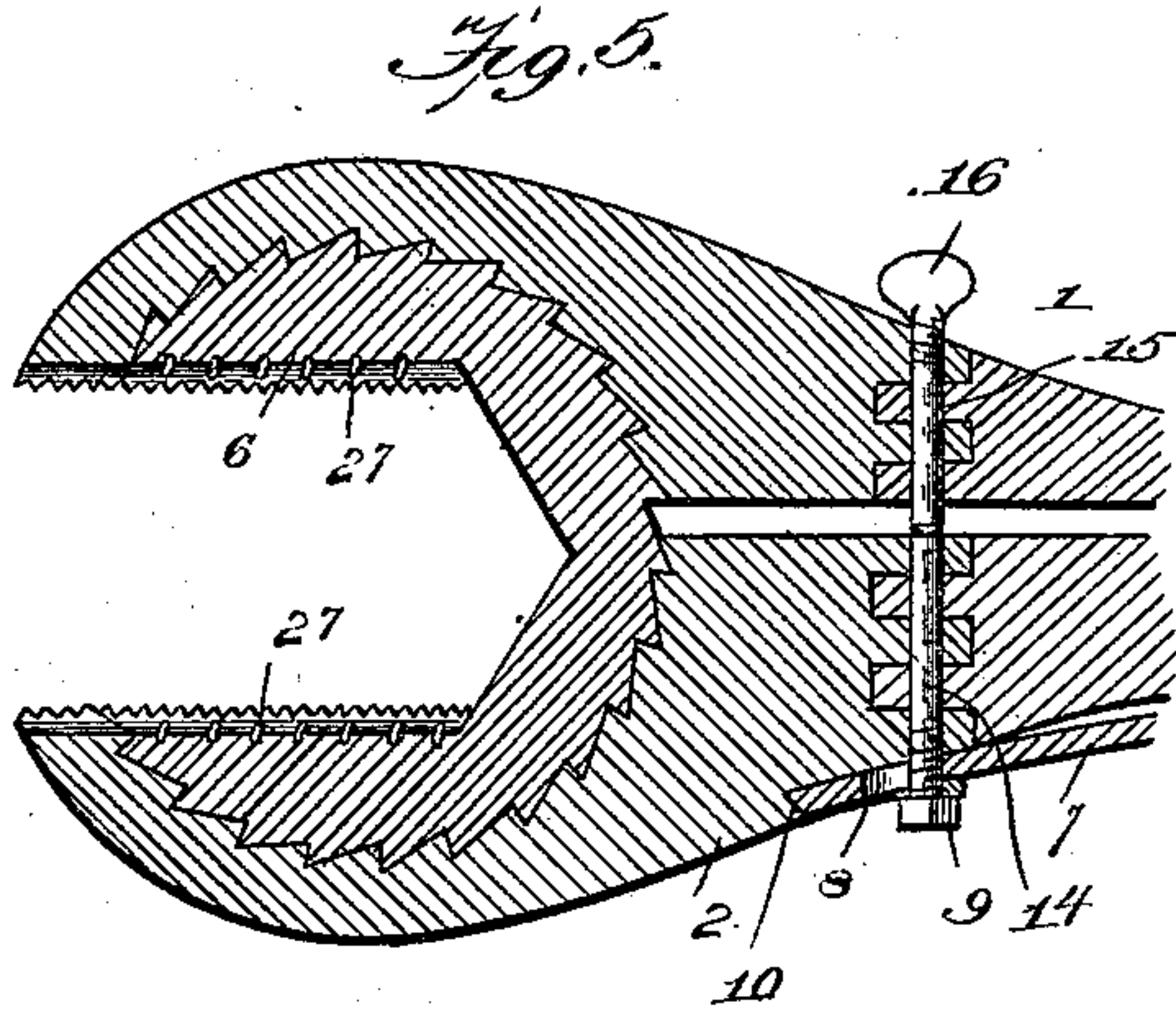
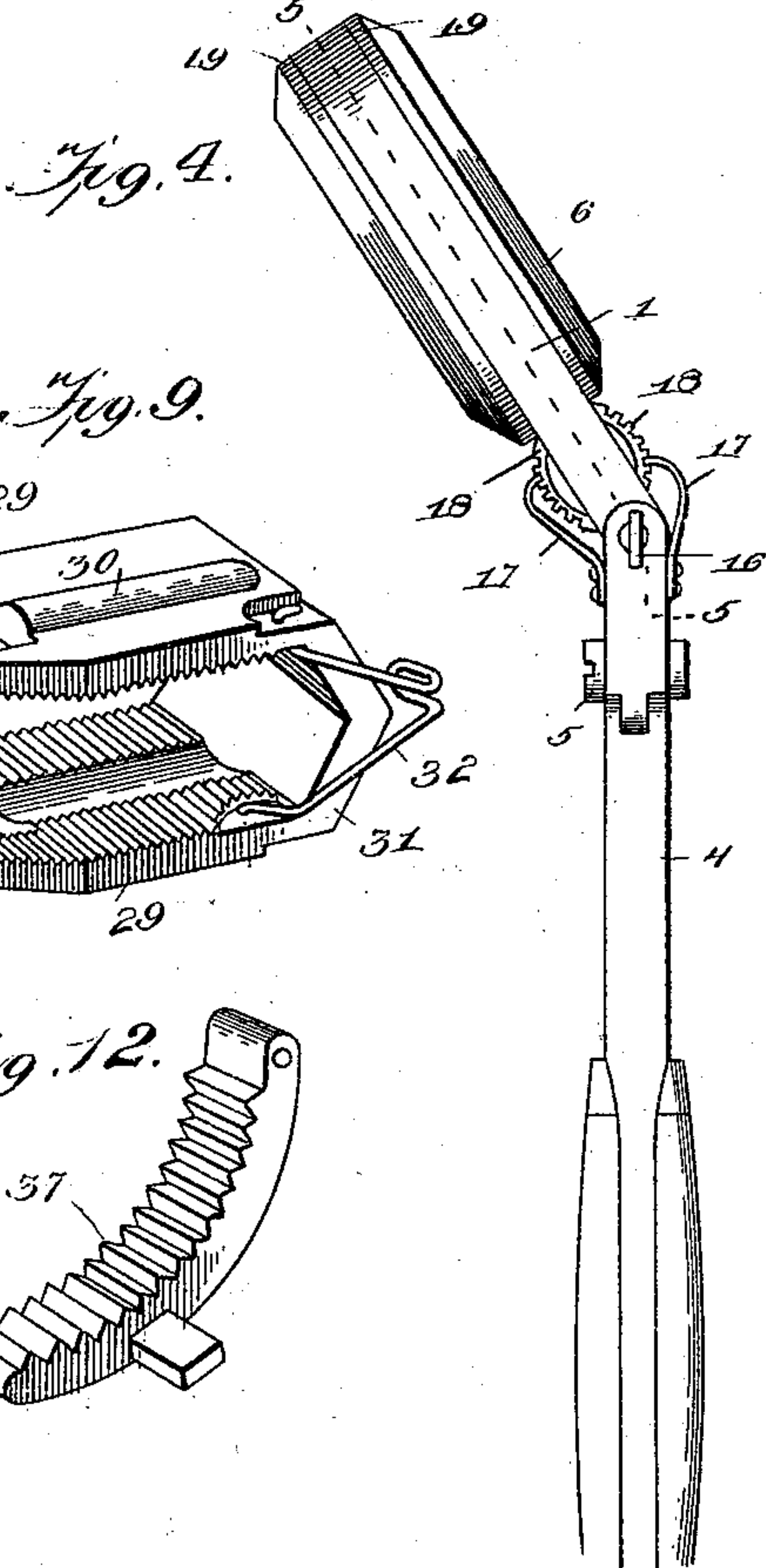
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2 Sheets—Sheet 2.

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John C. Shaw  
J. B. [Signature]

By his Attorneys.

Gustaf F. Johnson,  
C. A. Snow & Co.



# UNITED STATES PATENT OFFICE.

GUSTAF F. JOHNSON, OF WEST SUPERIOR, WISCONSIN.

## WRENCH.

SPECIFICATION forming part of Letters Patent No. 556,151, dated March 10, 1896.

Application filed August 28, 1895. Serial No. 560,765. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAF F. JOHNSON, a citizen of the United States, residing at West Superior, in the county of Douglas and State of Wisconsin, have invented a new and useful Wrench, of which the following is a specification.

My invention relates to wrenches, and particularly to that class known as "ratchet-wrenches," the objects in view being to provide a wrench having adjusting devices and interchangeable parts whereby it is adapted for various uses and for engaging different kinds and sizes of objects, and, furthermore, to provide simple means for mounting and dismounting the interchangeable parts.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side view of a wrench constructed in accordance with my invention. Fig. 2 is a central longitudinal section of the same. Fig. 3 is an edge view showing the jaw-actuating spring deflected in dotted lines. Fig. 4 is a view of the opposite edge, showing the jaws deflected from the line of the handle. Fig. 5 is a sectional view of the jaws and inclosed head on the plane indicated by the line 5 5 of Fig. 4. Fig. 6 is a detail view of the rotary head. Fig. 7 is a similar view of the adjustable gage-plate arranged in the cavity of the head. Fig. 8 is a detail view of the head, showing a gage or reducing-block arranged therein in lieu of the adjustable gage-plate. Fig. 9 is a detail view in perspective of said gage or reducing-block detached. Fig. 10 is a side view of the wrench, showing a modified form of head arranged between the jaws thereof, the jaws being shown separated to indicate the manner of arranging the head therebetween. Fig. 11 is a detail sectional view of the head shown in Fig. 10. Fig. 12 is a detail view of one of the ratchet-arms shown in Fig. 11 detached.

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

1 and 2 represent opposite similar jaws forming parts of pivotally-connected mem-

bers 3 and 4, said members being pivotally connected by means of a bolt 5, whereby the jaws may be separated to provide for the insertion or removal of a rotary head 6. A spring 7 is adjustably secured at one end to the jaw 2, and bears at its free end against the shank of the jaw 1, whereby the jaws are normally held in the closed position shown in Fig. 1. Said spring is longitudinally slotted, as shown at 8, for the reception of a bolt 9, and the extremity of the spring adjacent to the bolt is beveled to engage a beveled shoulder 10 on the jaw 2 to assist the bolt in holding the spring in its operative position. When it is desired to swing the spring laterally, as shown in Fig. 3, to provide for opening the jaws to adjust a different head, as shown in Fig. 10, the nut on the extremity of the bolt must be loosened and the spring moved longitudinally to disengage its extremity from the shoulder 10.

The shank of the member 3 is adapted to fit in a groove 11 in the shank of the member 4, whereby when the jaws are in their normal position the shank of the member 3 is approximately concealed by the shank of the member 4.

In addition to the pivotal joint between the members 3 and 4 of the wrench the jaws 1 and 2 are hinged, respectively, to their respective shanks to form the joints 12 and 13. The pivot 14 of the joint 13 is extended to form the bolt 9 by which the spring 7 is held in place, and the pivot 15 of the joint 12 is extended beyond the edge of the jaw 1 and is provided with a thumb-hold 16, said pivot being threaded in one of the members of the joint whereby it is capable of adjustment to serve as a limiting-pin to regulate the relative positions of the jaws. By adjusting said pin toward the jaw 2 the jaws may be held at a greater interval than when allowed to close until their contiguous parts are in contact, and by thus limiting the movement of the jaws toward each other the rotary movement of the head may be allowed without unnecessary friction or jamming.

In order to secure the jaws in the desired positions with relation to their shanks, I employ locking devices consisting of spring-latches 17 on the jaws provided with spurs to



engage the notches of segmental racks 18 on the shanks. By engaging the latches with different notches of the racks the jaws may be locked at the desired angular position or  
5 in the plane of the shanks.

The rotary head is provided with parallel flanges 19 to bear against opposite side surfaces of the jaws, and the groove 20 between said flanges incloses a ratchet for engagement  
10 by the ratchet-teeth upon the inner surfaces of the jaws. The actuating-spring 7 whereby the jaws are held in their normal positions provides for turning the jaws loosely upon the head during the backward movement of  
15 the wrench, and causes the teeth of the jaws to engage those of the head during the forward movement of the wrench in order to impart rotary motion to the head.

In Figs. 1 to 9 the form of head which I have  
20 illustrated is provided with a parallel-sided opening 21 for the reception of a nut or bolt-head, the inner end of the opening being V-shaped or angular in construction. The sides of this opening are serrated or roughened to  
25 properly engage the surfaces of a nut or bolt-head, and parallel guide-grooves 22 are formed in said sides for the reception of projections 23 formed at the opposite edges of a gage-plate 24 adapted to fit slidably between the  
30 sides of the opening in the head to form a space of greater or less size between the plane of its inner surface and the inner end of the opening to accommodate nuts and bolt-heads of different sizes. This gage-plate is secured  
35 at the desired adjustment to fit the nut or bolt-head to be operated by means of a pivotal button 25 mounted upon the outer surface of the plate and provided at its extremities with inclined ribs or threads 26 to engage mutilated  
40 threads 27 on the sides of the opening in the head between the guide-grooves 22. Thus when the opening in the head has been fitted upon a nut or bolt-head and the gage-plate has been pushed inward to bring it in contact with  
45 the outer side of the nut or bolt-head said adjusting-button should be turned to engage the mutilated threads at the sides of the opening and thereby secure the plate in its position.

By reason of the inclination of the threads  
50 on the extremities of the button and upon the sides of the opening the operation of turning the button into engagement with the last-named threads forces it more firmly against the outer side of the nut or bolt-head and  
55 thus prevents looseness during the operation of the wrench. The button is preferably provided upon opposite sides of its center with sockets 28 for the reception of studs on a suitable wrench, to facilitate the turning of the  
60 button into engagement with the mutilated threads on the sides of the openings in the head.

In Figs. 8 and 9 I have shown a reducing gage or block adapted to be fitted in the opening  
65 in the head in lieu of the above-described gage-plate, said reducing gage or block hav-

ing parallel side arms 29 provided upon their outer surfaces with rounded ribs 30 to fit in the concave surfaces in which are located the mutilated threads 27, said side arms being  
70 connected at their inner ends by an angular or V-shaped portion 31, which fits in the angular or V-shaped inner end of the opening in the head. This reducing gage or block is held in place when in use by means of a catch  
75 32 consisting of a bail provided at its lower end with a projection to fit in a socket 33 in the head. The inner surfaces of the arms of this gage or block are roughened or serrated to insure engagement with a nut or bolt-head.  
80

In addition to the above-described construction I also employ an interchangeable head  
85 34 adapted for engaging rods, pipes, and similar objects, said head being illustrated in Figs. 10 and 11, and being in construction substantially like the head shown in the former figures of the drawings, with the exception that the inner end of the opening 35 therein is rounded and the entire surface of said opening is toothed or serrated. In addition to this  
90 the head is slotted for the reception of swinging toothed arms 36 and 37, adapted to be swung at their free ends into the opening 35 to engage rods or tubes of smaller diameter than can be engaged by the teeth of the opening.  
95 These toothed arms are adjusted and held at the desired adjustment by means of screws 38. The operation of the wrench when this interchangeable form of head is employed is the same as that described in connection  
100 with the form adapted for engaging nuts and bolt-heads.

From the above description it will be seen that the angular adjustment of the jaws with relation to the shanks by which they are carried provides for the use of the tool in angles  
105 and in awkward positions where a straight wrench is useless, and more or less adjustment of the jaws may be attained without modifying the operativeness of the device.  
110

It is obvious that the wrench may be used independently of the heads to engage a round object, such as a pipe or rod of larger size than that which is adapted to be engaged by the interchangeable head shown in Figs. 10  
115 and 11.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this  
120 invention.

Having described my invention, what I claim is—

1. In a wrench, the combination of pivotally-connected members comprising shanks  
125 and jaws carried thereby, the jaws being hinged to the shanks, and means for securing the jaws at any angular adjustment with relation to the shanks, substantially as specified.  
130

2. In a wrench, the combination of pivotally-connected members having shanks and



jaws carried thereby, the jaws being hinged respectively to the shanks, and means for locking the jaws at the desired angular adjustment, such means consisting of latches carried by the shanks, and racks carried by the jaws and engaged by the latches, substantially as specified.

3. In a wrench, the combination of pivotally-connected members having shanks and jaws carried thereby, one of the shanks being fitted in a groove in the other shank and the jaws being hinged respectively to the shanks and adapted to be arranged in angular positions with relation to the shanks, a pivot-pin for one of the hinges extending beyond the lateral edge of the member, a plate-spring bearing at its free end against the shank of the other member and slotted to receive the projecting end of said pin, the extremity of the spring adjacent to the pin being beveled to engage a beveled shoulder on the member by which the spring is carried, and a nut for locking the spring in the desired position, substantially as specified.

4. In a wrench, the combination of pivotally-connected members having shanks and jaws carried thereby, the jaws being hinged to the shanks and adapted to occupy an angular position with relation thereto, a spring pivotally mounted upon one of the members to engage the other and hold the members in their normal positions, and a limiting-screw forming the pivot of the hinge between one of the jaws and its shank and adapted to be adjusted to limit the movement of the jaws under the pressure of said spring, substantially as specified.

5. In a wrench, the combination of pivotally-connected members having shanks and jaws carried thereby, the jaws being interiorly toothed, a spring for maintaining the jaws in their normal positions, a rotary head having a groove for the reception of the jaws, the bottom of the groove being toothed for engagement by the teeth of the jaws, said head having an opening provided with oppositely-disposed roughened or serrated sides, substantially as specified.

6. In a wrench, the combination of pivotally-connected spring-actuated members having shanks and jaws carried thereby, the jaws being interiorly toothed, a rotary head engaged by the jaws and provided with teeth to interlock with those on the jaws, said head having an opening which extends to one side

thereof, and adjustable means for varying the operative space of the opening to fit objects of different sizes, substantially as specified.

7. In a wrench, the combination with pivotally-connected spring-actuated members having interiorly-toothed jaws, of a rotary head arranged between the jaws and toothed for engagement thereby, said head having an opening extending to the side thereof, and a reducing-gage fitted in said opening to contract the same for the reception of objects of reduced size, substantially as specified.

8. In a wrench, the combination with pivotally-connected spring-actuated members having interiorly-toothed jaws, of a rotary head arranged between the jaws and toothed for engagement by the teeth thereof, said head having a parallel-sided opening extending to one side of the head, a gage-plate mounted to slide in said opening, and means for locking said plate at the desired adjustment, substantially as specified.

9. In a wrench, the combination with pivotally-connected spring-actuated members having interiorly-toothed jaws, of a rotary head arranged between the jaws and toothed for engagement by the same, the head being provided with a parallel-sided opening extending to one side thereof, a gage-plate mounted to slide in said opening and provided with projections engaging grooves in the parallel sides of the opening, and means for locking the gage-plate at the desired adjustment, substantially as specified.

10. In a wrench, the combination with pivotally-connected members having interiorly-toothed jaws, of a rotary head arranged between the jaws and toothed for engagement thereby, said head having a parallel-sided opening, a gage-plate mounted to slide in the opening in the head, mutilated threads at opposite sides of the opening, and a button provided with threads or ribs to engage said mutilated threads, the gage-plate being adapted to be forced inward upon an object when the button is turned to engage the mutilated threads, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GUSTAF F. JOHNSON.

Witnesses:

JOHN A. HOBE,

JULIUS OLESON.