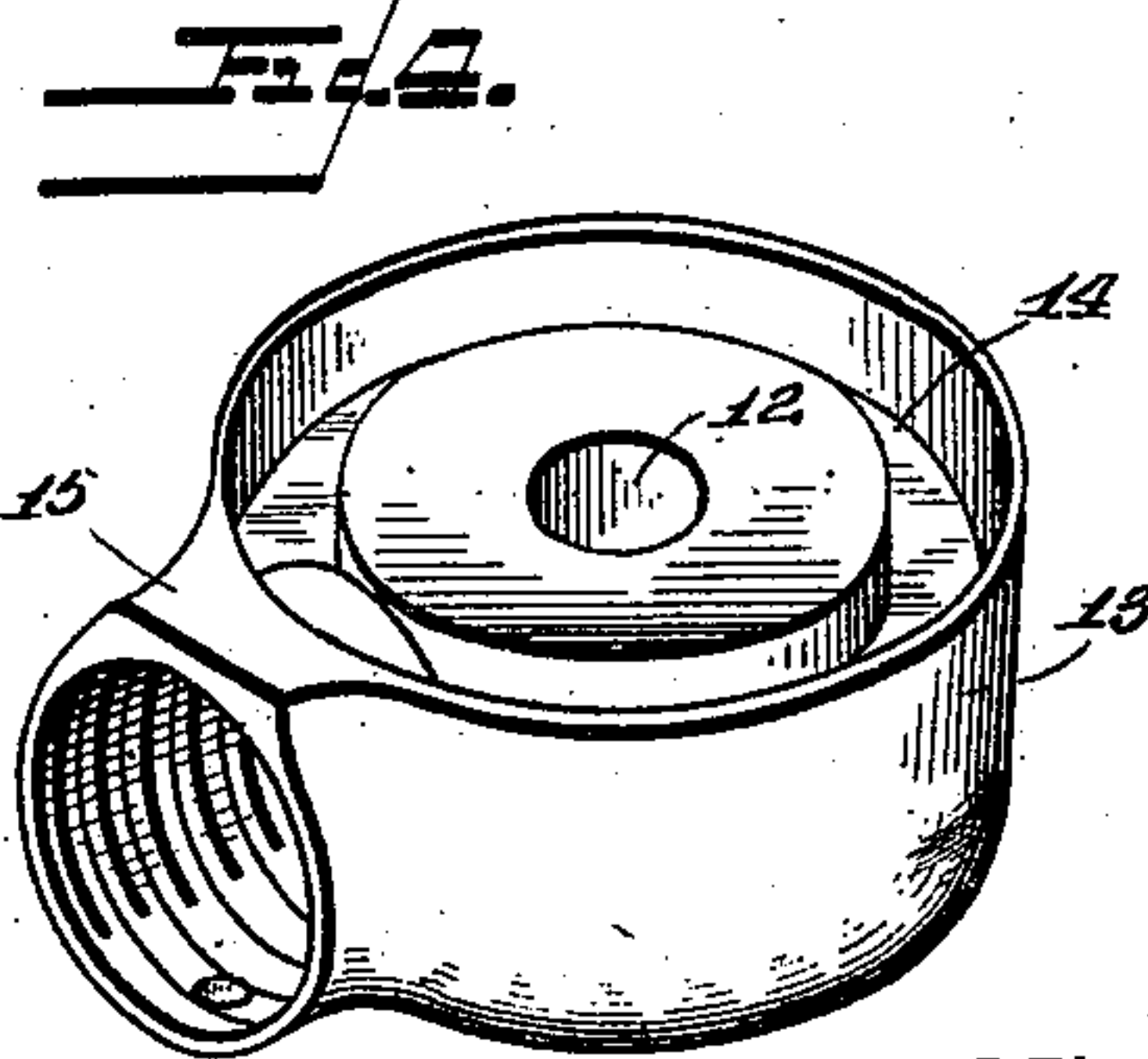
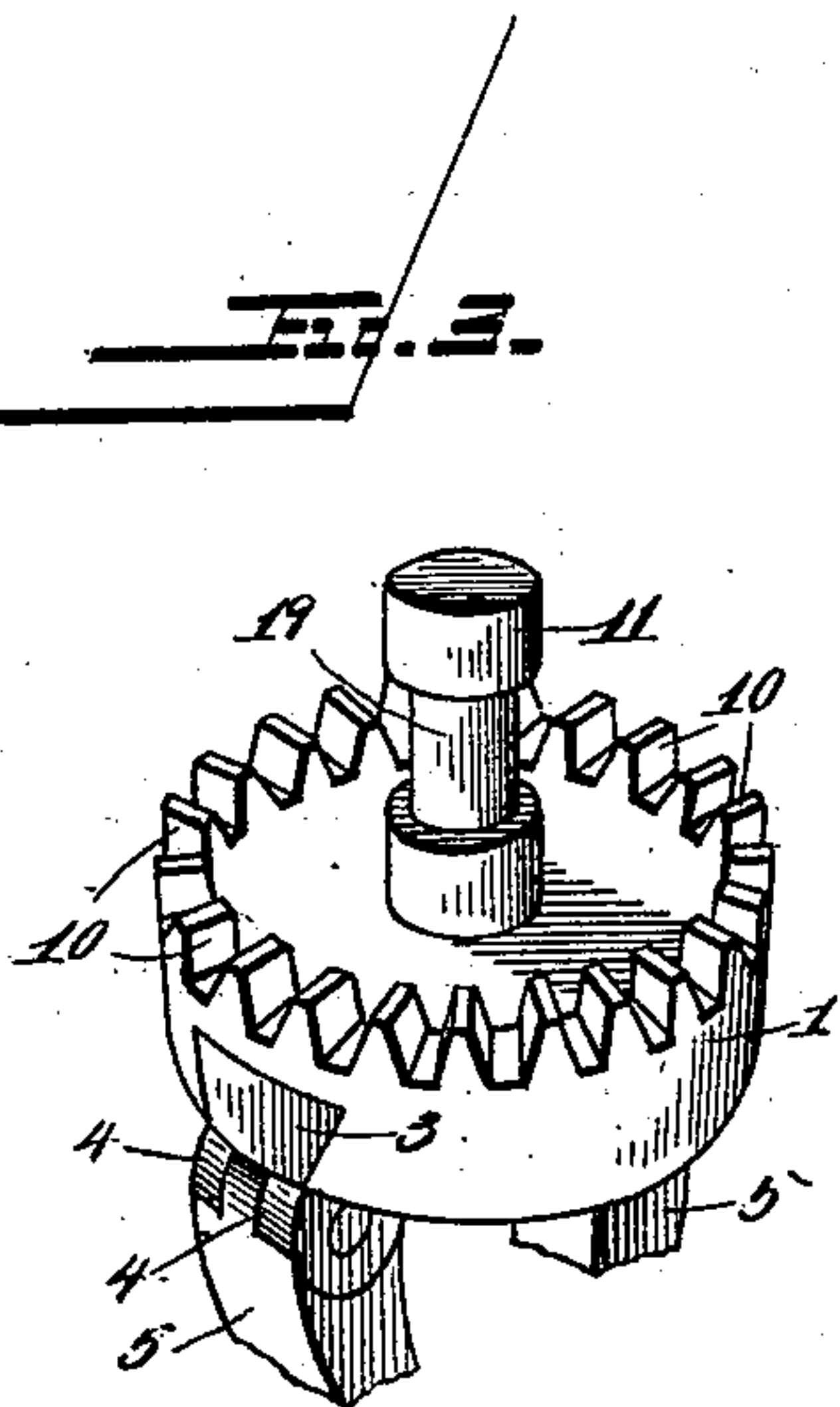
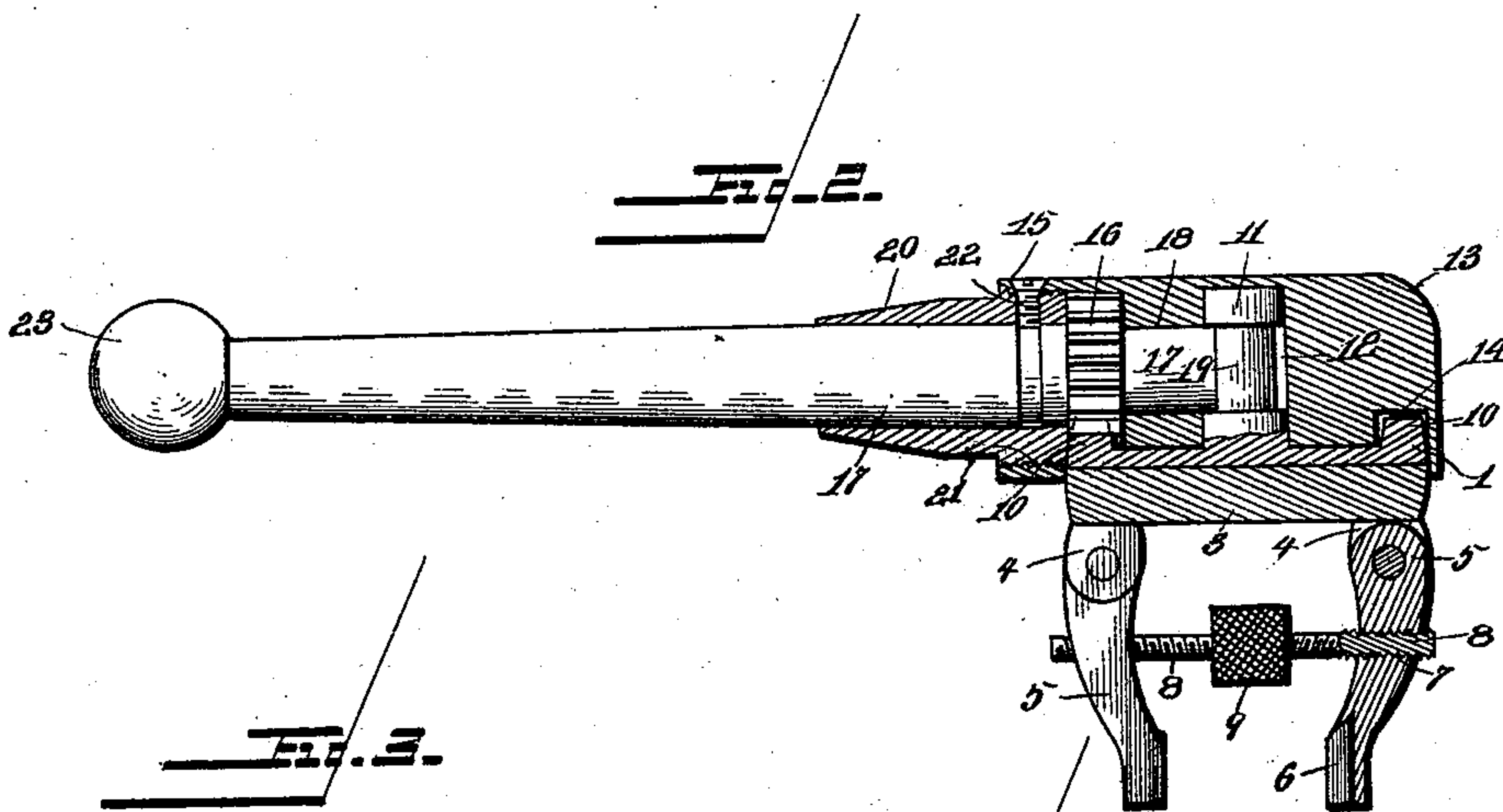
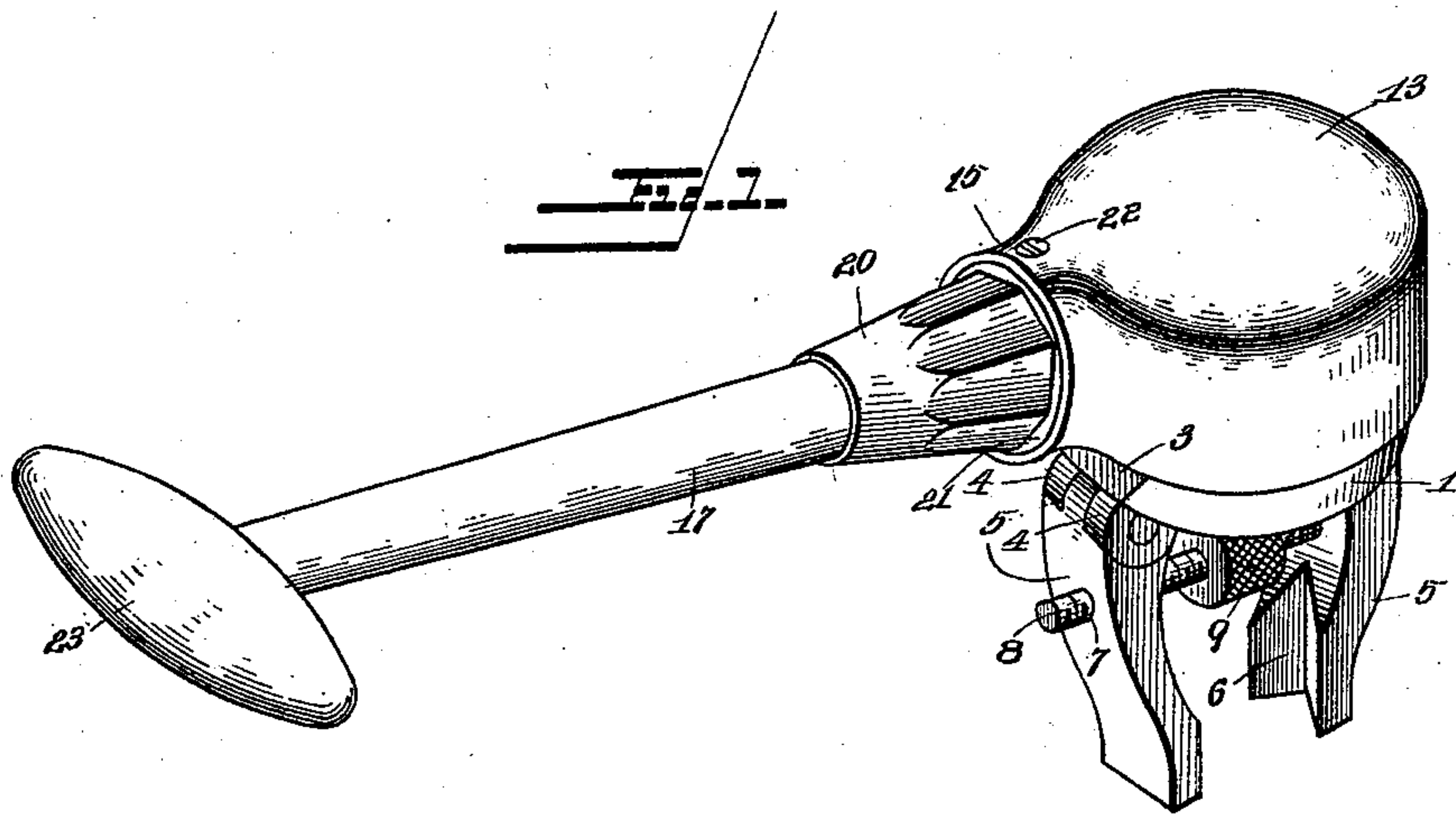


(No Model.)

C. P. NIXHOLM & J. M. LONG.  
WRENCH.

No. 541,494.

Patented June 25, 1895.



Witnesses  
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# UNITED STATES PATENT OFFICE.

COLLE P. NIXHOLM AND JAMES M. LONG; OF GLENDALE, MONTANA.

## WRENCH.

SPECIFICATION forming part of Letters Patent No. 541,494, dated June 25, 1895.

Application filed January 14, 1895. Serial No. 534,906. (No model.)

*To all whom it may concern:*

Be it known that we, COLLE P. NIXHOLM and JAMES M. LONG, citizens of the United States, residing at Glendale, in the county of Beaverhead and State of Montana, have invented a new and useful Wrench, of which the following is a specification.

This invention relates to an improvement in that class of wrenches wherein it is the object to impart to the head of that part which grips the nut a rotary movement without being obliged to swing the handle in a complete orbital line, thereby getting the full benefit of a continuous rotary movement at the head and without having to swing the handle completely around, which operation is inconvenient, and indeed, impossible in limited space.

The object of our invention is to improve the construction of this class of wrenches, and to provide one wherein the movement of the head will be practically continuous and will not partake of that step by step motion which is present in all other wrenches of the class referred to. This end we attain by connecting the handle with the head through the medium of two beveled gears meshing with each other, thus enabling one to give the head a continuous rotary movement by merely revolving the handle as is distinguished from swinging the same. This construction has a two-fold advantage, viz: It makes the movement of the head more regular and speedy, and it enables the wrench to be operated within a space only large enough to receive it, there being no necessity whatever of additional space, since the rotary movement of a shaft does not require any space additional to that which is occupied by the shaft.

The invention also embodies various subordinate features of construction and combinations of parts, all subservient to this broad feature, and it will be fully described hereinafter, and finally embodied in the claims.

In the drawings, Figure 1 represents a perspective view of a nut-wrench constructed after the manner of our invention. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a detail perspective of the head; Fig. 4, a perspective view of the cap or top portion of the head, the same being turned upside down.

The head of our improved wrench comprises an annular plate or disk 1, which has formed in its under side a dovetailed slot, 2 extending across it, and having securely fixed therein the correspondingly shaped bar 3. The bar 3 has formed integral with or rigidly secured to its ends the lugs 4, which are four in number and arranged in two pairs, one at each end.

5 indicates the jaws of our wrench, and these are two in number, and have at their upper ends reduced portions, which respectively fit between the lugs 4, and which are pivotally mounted therein by means of pins which pass through the lugs and through the reduced portions. By these means the jaws 5 are mounted so as to be capable of swinging toward and from each other, and their lower or free ends are provided with angular recesses 6 at their inner sides, which are adapted to receive opposite corners of a nut, and whereby they are connected thereto, so as to be incapable of accidental disconnection therewith.

Formed in the jaws 5, and horizontally aligned with each other are the internally threaded passages 7, one in each jaw, and which receive the screw 8. This screw is provided at its middle with a thumb nut 9, and its ends are threaded oppositely from each other, so that upon revolving the screw the jaws 5 will be moved toward or from each other. By these means they may be adjusted to the size of a nut, and made to engage the same, and also disconnect them from the nut.

The plate or disk 1 has formed at its upper side and at its periphery the crown gear 10, which should be beveled to a degree capable of permitting it to mesh with a gear having an axis at right angles to the axis of the gear 10.

11 indicates a stub shaft, which is rigidly secured to the upper side of the plate or disk 1, and which extends upwardly and axially coincident therewith. This shaft 11 is adapted to extend through a central opening 12 formed in the cap 13, and to have its upper end seated within the upper end of said central opening. Formed in the under side of the cap 13, and directly adjacent to its periphery is the groove 14, which is concentric with the cap 13, and which is adapted for the



reception of the crown gear 10. By these means the cap 13 and the head of the wrench are connected to each other, so as to be capable of free rotary movement, and so as to hide the gear 10, and to protect the same from injury resulting from its exposure.

The cap 13 is provided with an offset portion 15, which is formed hollow throughout its extent, and which hollow is provided for the reception of a gear 16 fixed to the shaft 17, which is the operating shaft of the wrench.

The hollow portion or cap near the offset 15 is continued into a reduced opening 18, and this communicates with the central passage 12 of the cap 13. In this reduced opening 18 the inner extremity of the shaft 17 is adapted to have a bearing. This arrangement of the parts permits the gear 16 to project into the upper portion of the groove 14, and to thereby engage with the gear 10. Thus the shaft 17, and the head of the wrench or the disk or plate 1 are connected to each other. The shaft 11 is provided with a reduced portion 19 located intermediate of its ends and directly opposite the opening 18. The purpose of this reduced portion 19 is to permit the inner end of the shaft 17 to engage with the shaft 11, so that the shafts may be connected to each other, and the head of the wrench or the plate or disk 1 may be connected to the cap 13. This object is attained by passing the inner end of the shaft 17 into the opening 12 for a slight distance.

20 indicates a sleeve which is rotatably mounted on the shaft 17, or more properly within which the shaft 17 is rotatably mounted, and which has at its inner end an enlarged and externally threaded cylindrical portion 21, which is adapted to engage with a corresponding internally threaded portion in the offset 15. By these means the sleeve is rigidly connected to the cap 13, and this location of the sleeve prevents the shaft 17, owing to the engagement of the gear 16 and the sleeve 20, from being moved out of the cap 13. The outer portion of the sleeve 20 is made angular in form, so as to permit the connection of a wrench therewith, whereby the sleeve is tightened in position.

22 indicates a set-screw, and this is passed through the upper side of the offset 15 and into the cylindrical portion 21 of the sleeve 20, whereby the said sleeve is locked, so as to be incapable of accidental disconnection. The outer end of the shaft 17 is provided with a cross bar 23, by which this operation is facilitated and made easy.

The use and operation of our invention will be fully understood from the drawings and the above description, and by reference to the drawings, it will be seen that all that is necessary to the operation, is that the parts be assembled in the positions there shown, and the jaws 5 connected with the nut as in any

other wrench. The head is now made to revolve by turning the shaft 17, by means of the cross bar 23, all of which will be obvious.

It will be observed that the wrench may be operated without the slightest lateral movement of the shaft 17, and that, as explained in the first part of this specification, no more space is required for the operation of the wrench than is required for its location.

In operating the wrench the cap 13 should be grasped with one hand so as to steady the arrangement, and so as to make its operation easier. This is not absolutely necessary, however, and if the position of the wrench and its surroundings be such as to make this inconvenient or impossible, it may be dispensed with.

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

Having thus described our invention, what we claim, and desire to obtain by Letters Patent, is—

1. In a wrench, the combination with a cap having an annular groove in its lower face, of a circular head rotatably mounted therein and provided at its periphery with vertically disposed teeth and also having an upwardly extending grooved stub-shaft, an operating shaft mounted within the cap, and having an annular groove therein, the inner end of said operating shaft being in engagement with the groove in said stub-shaft, a gear on the operating shaft meshing with the teeth on the head, and means for engaging said operating shaft for holding the same against displacement, substantially as described.

2. The combination of a cap, a circular toothed head revolubly mounted in and partially inclosed by the cap, a shaft arising centrally from the head, and formed with an annular groove or depression, an operating shaft rotatably mounted within the cap, and having its inner end in engagement with the groove in the shaft of the head, and also provided with an annular groove, a retaining set screw for engaging said groove, and a gear fixed to the operating shaft and meshing with the gear on the head, substantially as described.

3. In a wrench, the combination of a cap having a central passage and an annular groove on its under side, a head having a raised beveled gear on its upper side, and said gear being fitted within the groove of the cap, a vertically rising stub shaft fixed to the head and extending axially coincident therewith, and into the central passage of the cap, the said shaft having a reduced portion midway its ends, an operating shaft fitted within the cap, and having its inner end engaged with the reduced portion of the stub shaft, so as to hold the stub shaft, and conse-



quently the head in place, a beveled gear on  
the operating shaft and meshing with the  
gear on the head, and a sleeve within which  
the operating shaft is rotatably mounted, the  
5 said sleeve being fixed to the cap and serving  
to prevent the displacement of the operating  
shaft, substantially as described.

In testimony that we claim the foregoing as

our own we have hereto affixed our signatures  
in the presence of two witnesses.

COLLE P. <sup>his</sup> × NIXHOLM.

JAMES M. <sup>mark</sup> LONG.

Witnesses:

E. H. HARVEY,  
GEO. B. CONWAY.