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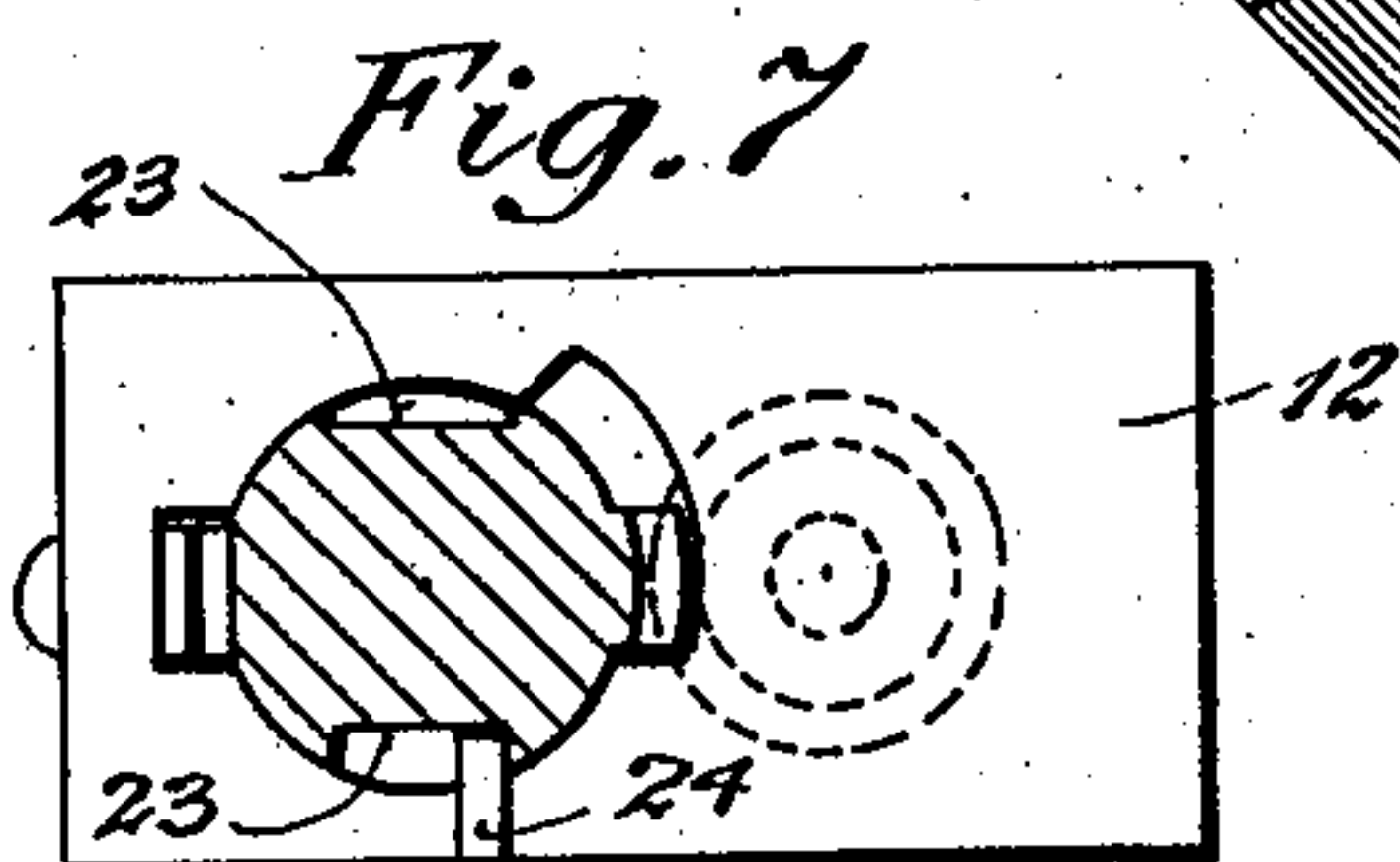
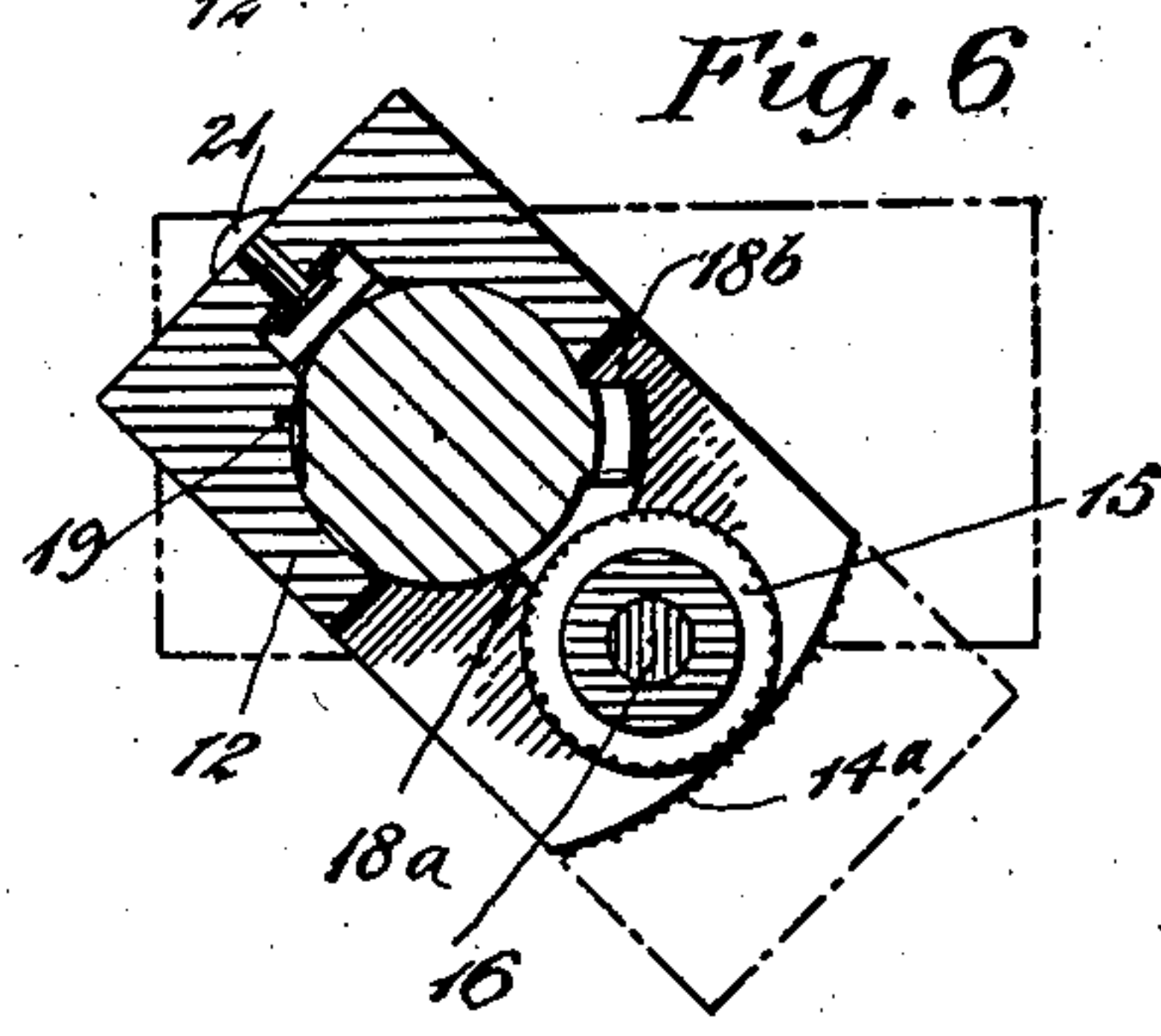
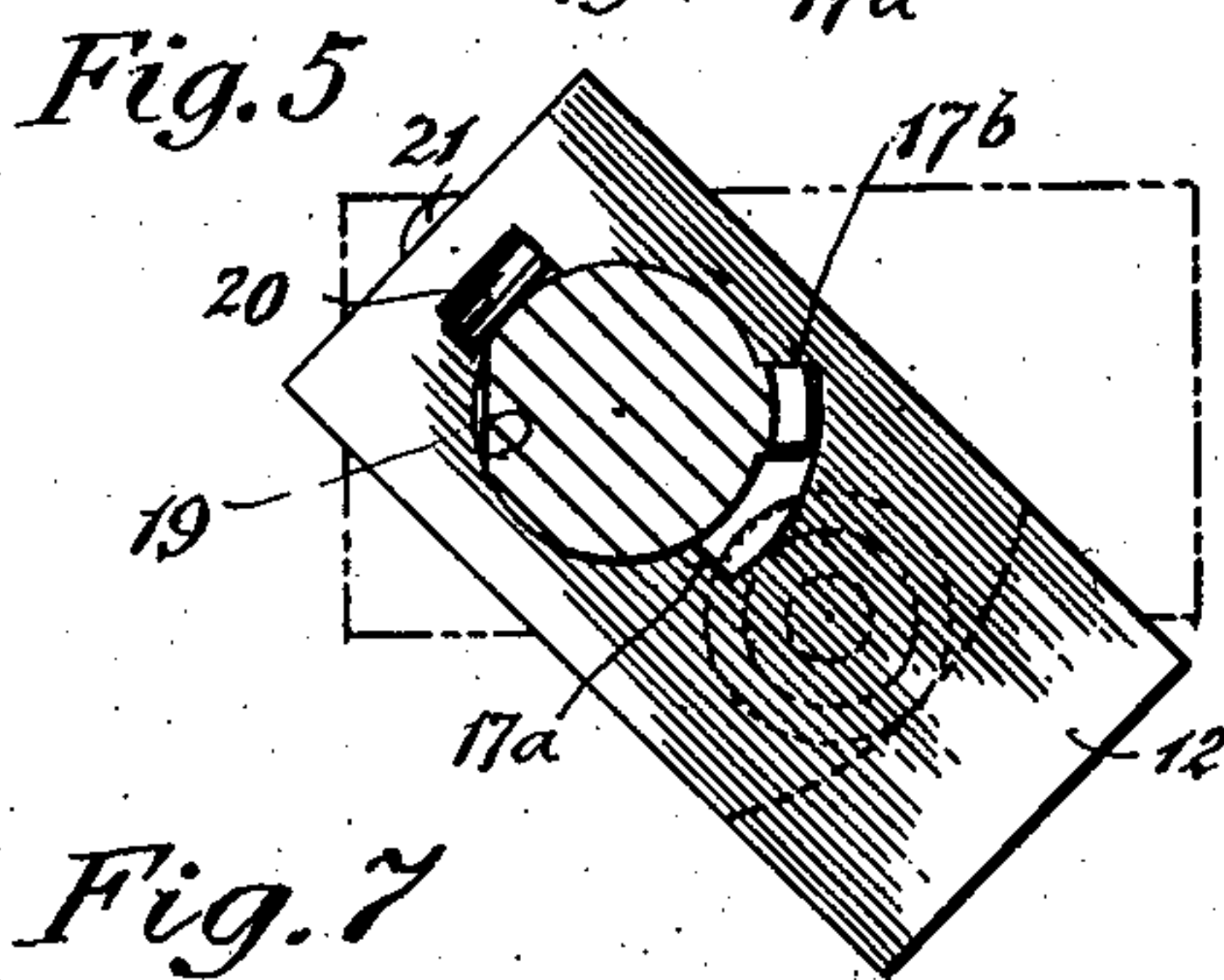
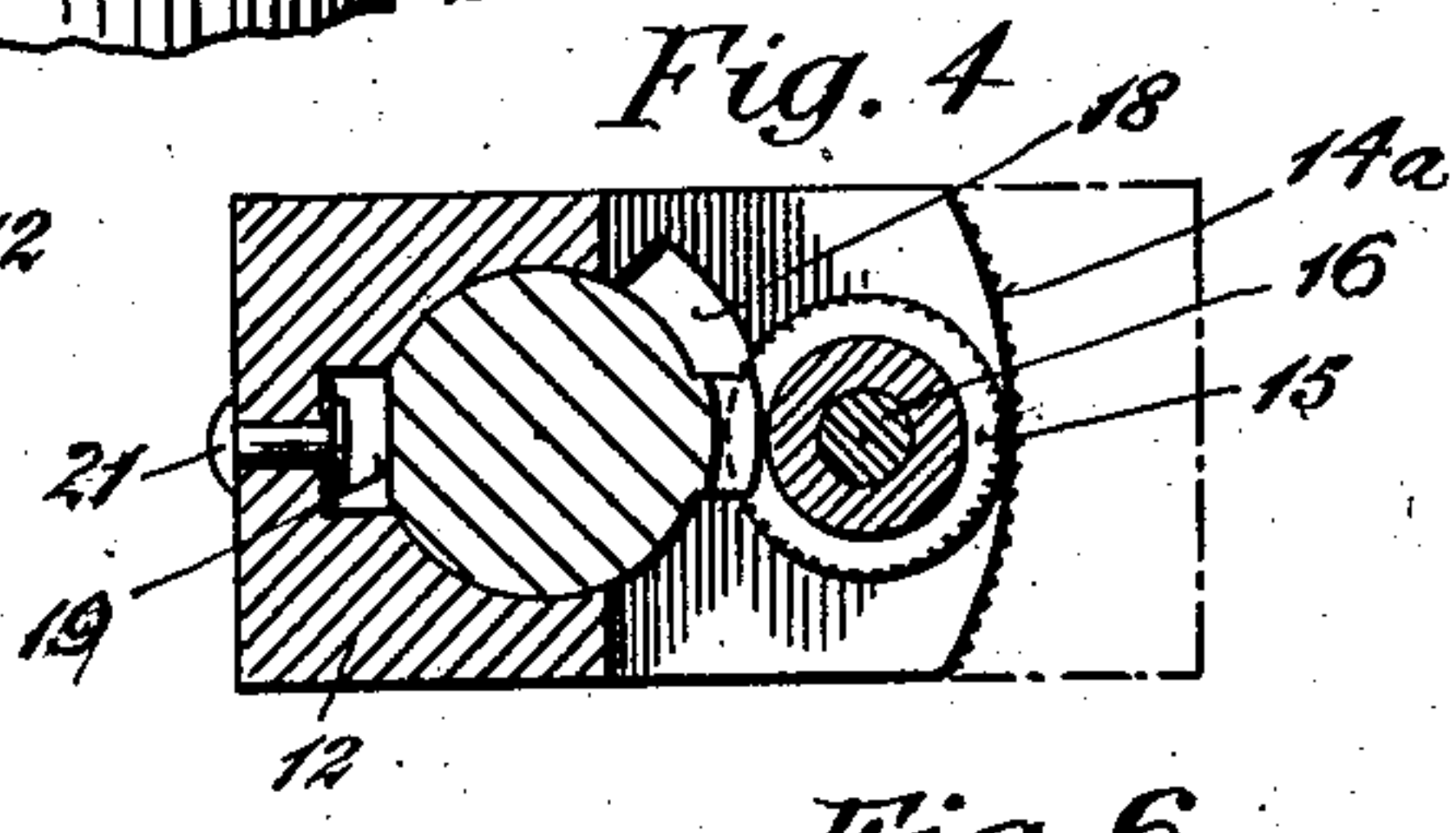
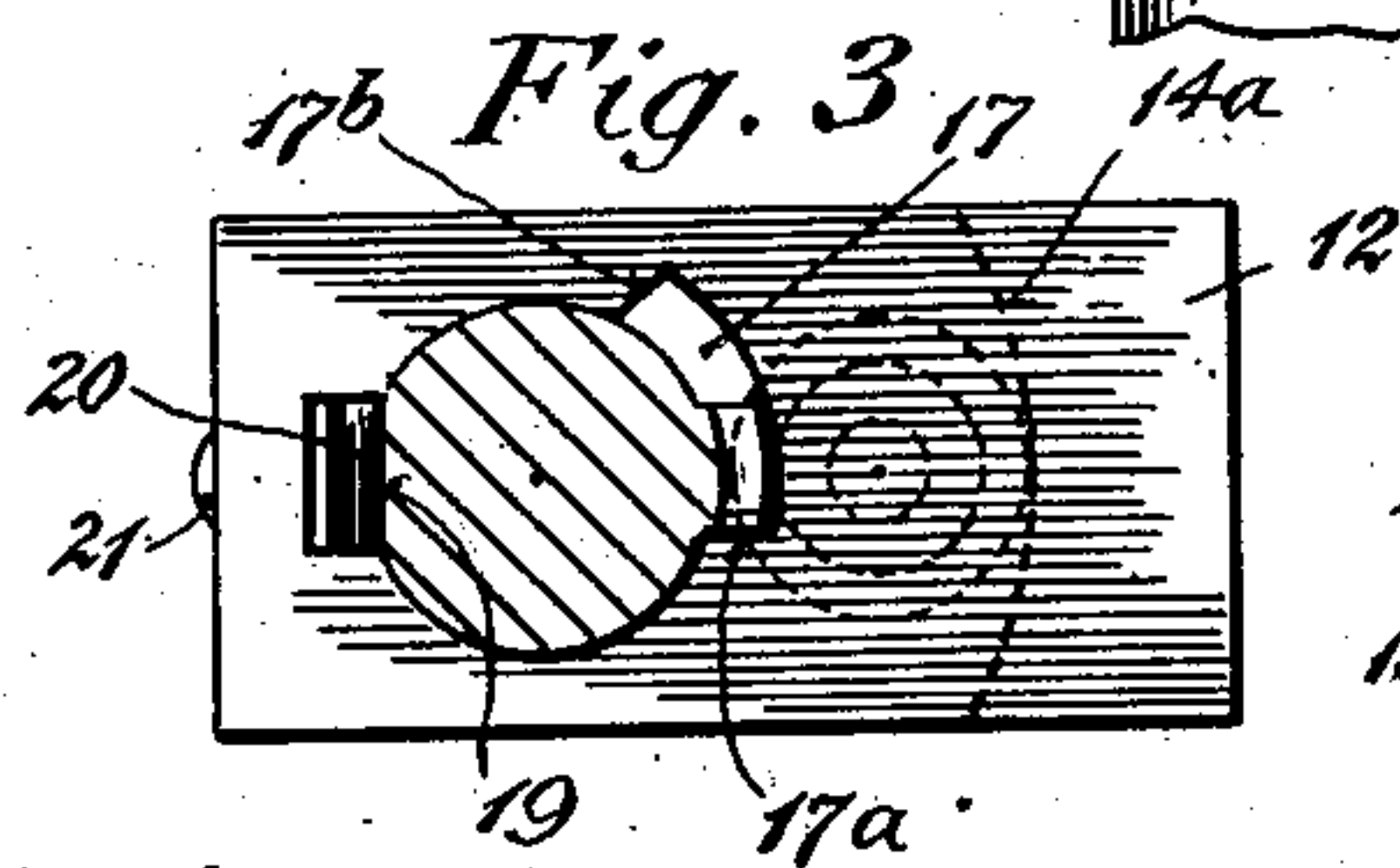
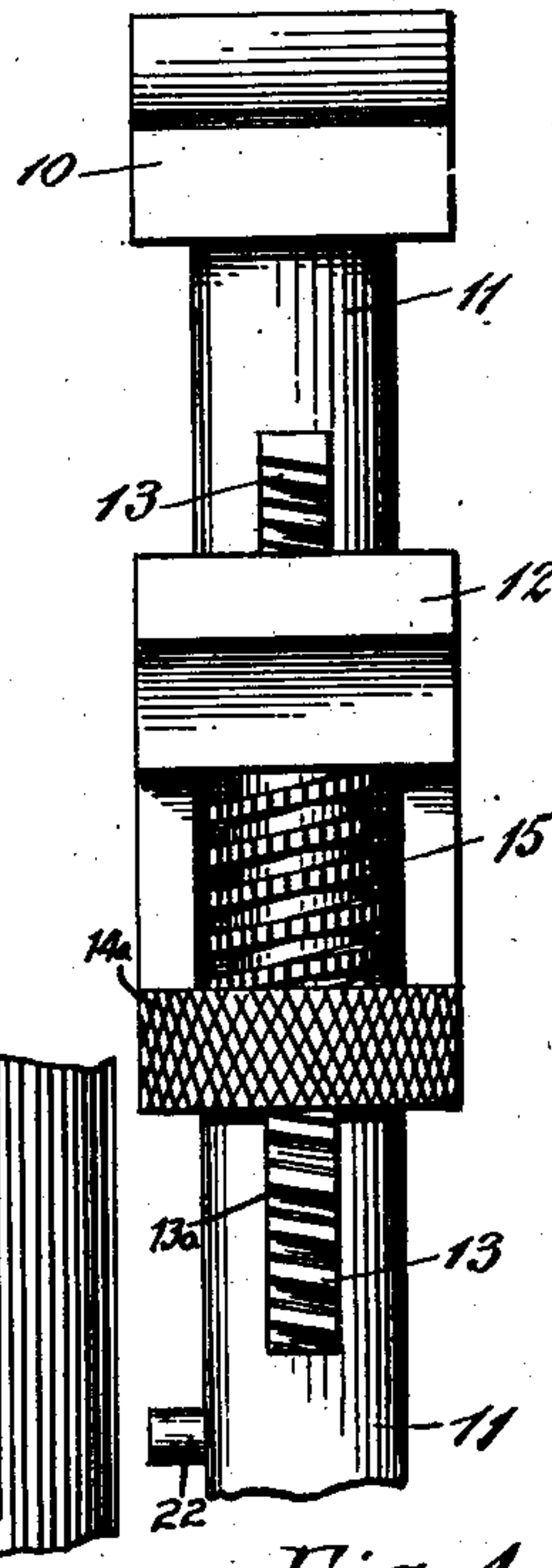
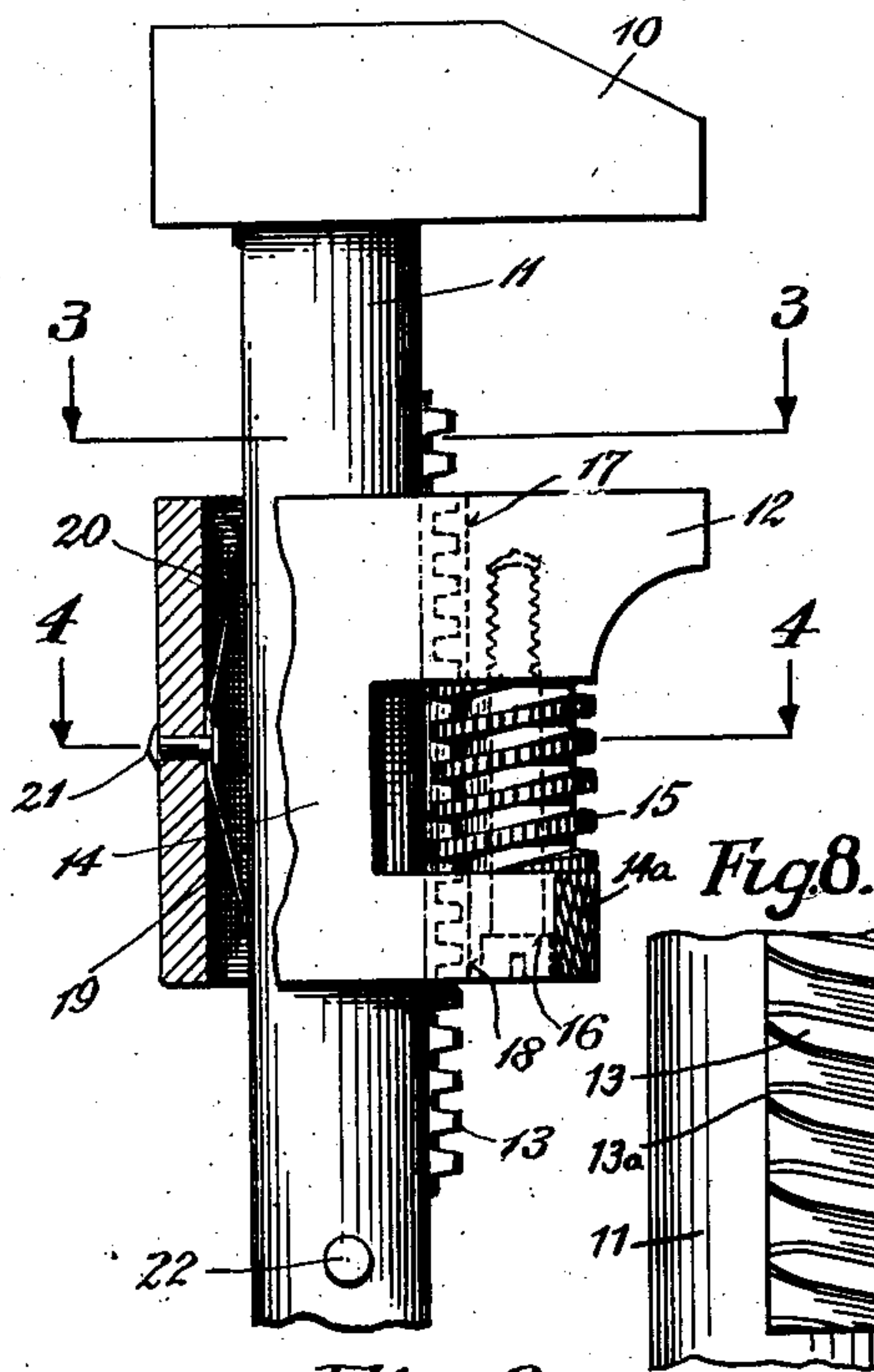
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ADJUSTABLE WRENCH

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Fig. 1

Fig. 2



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ADJUSTABLE WRENCH

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This invention relates to adjustable wrenches, and more particularly to means for facilitating the setting of the wrench to grasp an object to be turned.

An object of the invention is to provide a simplified adjustable wrench having means for quickly initially setting the jaws to approximate position, whereby only few parts, mostly basic to wrench construction, are required.

In the embodiment shown, this is accomplished by providing a novel shank and movable jaw assembly, wherein the jaw is not only slidably mounted on the shank but also rotatably mounted thereon to provide for disengagement of the jaw-driving means by a relative turning of said jaw and shank.

Another object of the invention is to provide such an adjustable wrench wherein the jaws will not inadvertently change in their setting during the use of the wrench.

In the wrench of the present invention with the jaws in adjusted position, the disengaging movement of the jaw-driving means causes a slight closing of the wrench jaws. However, during the working stroke of the wrench, the jaws are tightly gripping the object to be turned and therefore cannot close further than their adjusted setting. As a result, the releasing or disengaging movement of the jaw-driving means is prevented, and therefore inadvertent opening of the jaws due to disengagement of said means cannot occur.

An advantageous feature of this invention is the provision of an improved adjustable wrench permitting a quick initial setting of the jaws to approximate size, wherein this operation may be conveniently carried out entirely with the fingers of the hand that holds the shank of the wrench while the latter is being positioned against the part it is to turn, and wherein the final driving adjustment of the jaws may be accomplished in the same manner.

This is accomplished by providing a novel arrangement of jaw-driving means and release therefor wherein a worm and rack may be bodily moved relatively to each other in a direction axially of the teeth of the latter by a simple shifting of parts by the fingers of the hand holding the shank, to disengage the worm and rack and permit quick initial adjustment of the jaws.

Other features and advantages will hereinafter appear.

In the accompanying drawings—

Figure 1 is a fragmentary side view of the adjustable wrench of the present invention with a portion of the movable jaw body cut away.

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Fig. 2 is a fragmentary front elevation of the wrench.

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

Fig. 4 is a section taken on the line 4—4 of Fig. 1.

Fig. 5 is a section similar to Fig. 3 but with the movable jaw rotated to a position wherein the jaw-driving means are disengaged.

Fig. 6 is a section similar to that of Fig. 4 but showing the movable jaw in a partially rotated position similar to that of Fig. 5.

Fig. 7 shows another embodiment of the invention illustrating an alternative stop mechanism to limit turning of the movable jaws of the wrench.

Fig. 8 is a detail view of the teeth of the rack.

As shown in Figs. 1 and 2, the wrench embodying the present invention comprises a fixed jaw 10 mounted on a shank 11 which carries a movable jaw 12 adapted to cooperate with the fixed jaw 10 for grasping nuts or other objects to be turned.

The movable jaw 12 is mounted on the shank 11 to permit slidable advancing and retracting movement thereon with respect to the fixed jaw 10.

For the purpose of driving the movable jaw 12 the shank 11 is provided with a rack 13 having diagonally disposed teeth, and extending lengthwise of the shank, and the jaw 12 has a body 14 having a recess in which a worm or knurl 15 is rotatably mounted to engage and mesh with the rack 13. Referring to Fig. 1, the rotatable mounting of the worm 15 is accomplished by a screw 16 having a smooth shank to provide a bearing for the worm. The teeth of the rack 13 project above the surface of the shank 11, and to provide clearance for them the body 14 of the movable jaw is provided with longitudinal grooves 17 and 18 in the upper and lower portions respectively.

According to the invention, there is provided a novel and improved means for disengaging the worm 15 and rack 13, said means being easily manipulated by the fingers and providing for quick relative bodily movement between the worm and rack in a direction axially of the teeth of the latter.

This is accomplished in the embodiment shown by making the shank 11 round so that it has a circular cross-section and by providing the body 14 of the movable jaw with a round bore through which the shank extends, so that the jaw 12 is rotatable on the shank 11 as well as slidable lengthwise thereof. Referring to Figs. 3 and 4, the

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grooves 17 and 18 are made wider than the teeth of the rack 13 to permit partial rotation of the jaw body 14 so that the worm 15 can be bodily shifted relatively to the rack 13 and axially of the teeth thereof to disengage same.

By this construction and arrangement of parts there is provided an extremely simple and efficient means for disengaging the driving mechanism for the movable jaw 12 so that the latter can be quickly slid along the shank 11 to any desired position approximating the size of work to be handled. In order to effect this quick initial adjustment of the jaws it is only necessary to partially turn the body 14 about the shank with the fingers to disengage the worm 15, and then slide the body and the jaw 12 to the desired position, and again partially rotate same to re-engage the worm and rack. The final minute and powerful driving of the jaw 12 is then accomplished by turning the worm 15 in the usual manner.

It is at present preferred to limit the turning movement of the jaw 12 and body 14 by having the sides of the rack 13 engage the walls of the grooves 17 and 18. As shown in Figs. 3 and 4, wherein the worm 14 engages the rack 13 and the jaws 10 and 12 are in alignment, one side of the rack 13 engages the walls 17a and 18a of the grooves 17 and 18 respectively.

When the jaw 12 and body 14 are partially rotated to the position as shown in Figs. 5 and 6, wherein the worm 15 is disengaged from the rack 13, the other side of the rack 13 engages the side walls 17b and 18b of the grooves 17 and 18 respectively.

It should be noted that the turning disengaging movement of the jaw 12 and body 14, results in a bodily shifting of the worm 15 past the side 13a of the rack 13. In so turning, and assuming that the worm 15 does not rotate about the screw 16, the movable jaw 12 is advanced slightly toward the fixed jaw 10. This is an important feature of the invention inasmuch as it provides against inadvertent shifting or release of the jaws 10 and 12 from their final setting during use of the wrench. It can be readily seen that when the wrench is in working position, tightly grasping an object to be turned, it is not possible for the jaws to move toward each other, and thus disengaging movement of the jaw 12 and body 14 is prevented. Furthermore, as the wrench is being operated to turn an object, the force on the jaws 10 and 12 tending to open or spread them increases in magnitude. This increase tends to hold the jaw 12 and body 14 more firmly in its working position in alignment with the jaw 10.

For the purpose of facilitating re-engagement of the worm 15 and rack 13 after the jaw 12 has been initially quickly moved to its approximate setting, according to the invention, the teeth of the rack 13 along the side 13a thereof are narrowed to less than normal thickness. This enables the worm to move into engaging position with the rack even though the threads and teeth are not initially in exactly perfect alignment.

The invention further provides for yieldably holding the movable jaw 12 and body 14 in aligned position with the fixed jaw 12 so that the worm 15 and rack 13 are prevented from being disengaged accidentally. This may be accomplished in any suitable way. In the embodiment shown, Fig. 1, a flat 19 is provided extending lengthwise along the back surface of the shank 11 and adapted to be engaged by a spring 20 carried in a groove 21 in the round bore of the

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body 14. The spring 20 is preferably made of flat stock, with two arms contacting the flat 19 and is fastened to the body 14 by a rivet 21.

To facilitate manipulation of the body 14 by the fingers of one hand, so as to cause engagement and disengagement of the worm 15 and rack 13, the lower front portion 14a of said body is rounded and knurled as shown in Figs. 1 and 2 to provide a non-skid surface.

After the wrench as described above is assembled, a stop is set in the shank 11 to prevent the movable jaw and the body 14 from inadvertently sliding off the shank, said stop in the present preferred form of the invention comprising a pin 22 pressed tightly into place as shown in Figs. 1 and 2. It should be noted that while the shank 11 is almost completely circular as shown in Figs. 3 to 6, it may have flat or recessed portions 23 as shown in Fig. 7 so long as enough of a cylinder remains to form a bearing for the slidable and rotatable jaw.

Referring to Fig. 7, another embodiment of the invention is shown wherein means other than the rack 13 is provided for limiting the turning movement of the jaw 12 and body 14. According to this embodiment, the recessed portions 23 of the shank 11 are made in the form of longitudinally extending grooves, and a pin 24 is carried by the body 14 of the movable jaw to extend into one of said grooves, and by contact with the sides thereof, limit turning movement of the jaw body to the desired angle.

It should be understood, of course, that any of the various types of handles may be mounted on the lower end of shank 11 as desired.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

1. An adjustable wrench having a shank, a stationary jaw attached thereto, a movable jaw; a rack fastened to the shank to extend lengthwise thereof; an adjusting worm rotatably mounted on the movable jaw for driving same; means for rotatably mounting the movable jaw on the shank so that the worm and rack mesh, and so that the jaw may be turned on the shank about the longitudinal axis thereof to bodily shift the worm laterally past the side edge of the rack to disengage same for permitting free travel of the movable jaw and worm on the shank; and means for limiting lateral movement of the jaw in worm-engaging and worm-disengaging positions.

2. An adjustable wrench having a round shank; a stationary jaw attached thereto; a rack fastened to the shank to extend lengthwise thereof, the teeth of the rack projecting above the surface of the shank; a movable jaw slidably mounted on the shank, said jaw having a round bore through which the shank passes, and having a groove providing clearance for the teeth of the rack; and a finger operable worm rotatably mounted on the movable jaw and meshing with the rack, the walls of said groove determining the positions of the jaw by contact with opposite sides of the rack and the width of the groove being such that the movable jaw can be partially rotated on the shank from the plane of the stationary jaw sufficiently to disengage the worm from the rack, and allow free sliding of the movable jaw and worm on said shank.

3. An adjustable wrench having a round shank, a stationary jaw attached thereto; a rack fastened to the shank to extend lengthwise thereof,

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the teeth of the rack projecting above the surface of the shank; a movable jaw slidably mounted on the shank, said jaw having a round bore through which the shank passes, and having a groove providing clearance for the teeth of the rack; a finger operable worm rotatably mounted on the movable jaw and meshing with the rack, the walls of said groove determining the position of the jaw by contact with the opposite sides of the rack and the width of the groove being such that the movable jaw can be partially rotated on the shank from the plane of the stationary jaw sufficiently to disengage the worm from the rack, and allow free sliding of the movable jaw and worm on said shank; and means for yieldably holding the movable jaw in aligning position with the fixed jaw to hold the worm in engagement with the rack.

4. An adjustable wrench having a round shank with a flat on one side, a stationary jaw attached to the shank; a rack fastened to the shank to extend lengthwise thereof, the teeth of the rack projecting above the surface of the shank; a movable jaw slidably mounted on the shank, said jaw having a round bore through which the shank passes, and having a groove providing clearance for the teeth of the rack; a finger operable worm rotatably mounted on the movable jaw and meshing with the rack, the walls of said groove determining the position of the jaw by contact with opposite sides of the rack, and the width of the groove being such that the movable jaw can be partially rotated on the shank from the plane of the stationary jaw sufficiently to disengage the worm from the rack, and allow free sliding of the movable jaw and worm on said shank; and a spring carried by the movable jaw and engaging the flat of the shank to yieldably hold the jaw in position where the worm and rack are in engagement.

5. An adjustable wrench having a round shank, a stationary jaw attached thereto; a rack fastened to the shank to extend lengthwise thereof, the teeth of the rack projecting above the surface of the shank; a movable jaw slidably mounted on the shank, said jaw having a round bore through which the shank passes, and having a groove providing clearance for the teeth of the rack; a finger operable worm rotatably mounted on the movable jaw and meshing with the rack, the width of the groove in the movable jaw being such that said jaw can be partially rotated on the shank from the plane of the sta-

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tionary jaw sufficiently to disengage the worm from the rack, and allow free sliding of the movable jaw and worm on said shank; and means for limiting the turning movement of the movable jaw between a position aligning same with the fixed jaw, and a partially rotated position wherein the worm carried by the movable jaw is disengaged from the rack.

6. An adjustable wrench having a round shank with a longitudinally extending groove therein, a stationary jaw attached to the shank; a rack fastened to the shank to extend lengthwise thereof, the teeth of the rack projecting above the surface of the shank; a movable jaw slidably mounted on the shank, said jaw having a round bore through which the shank passes, and having a groove providing clearance for the teeth of the rack; a finger operable worm rotatably mounted on the movable jaw and meshing with the rack, the width of the groove in the movable jaw being such that the movable jaw can be partially rotated on the shank from the plane of the stationary jaw sufficiently to disengage the worm from the rack, and allow free sliding of the movable jaw and worm on said shank; and a pin carried by the movable jaw and extending into the groove in the shank, said groove and pin permitting free advancing and retracting movement of the movable jaw, and permitting turning movement of the jaw only between a position aligning same with the stationary jaw and a position wherein the worm is disengaged from the rack.

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