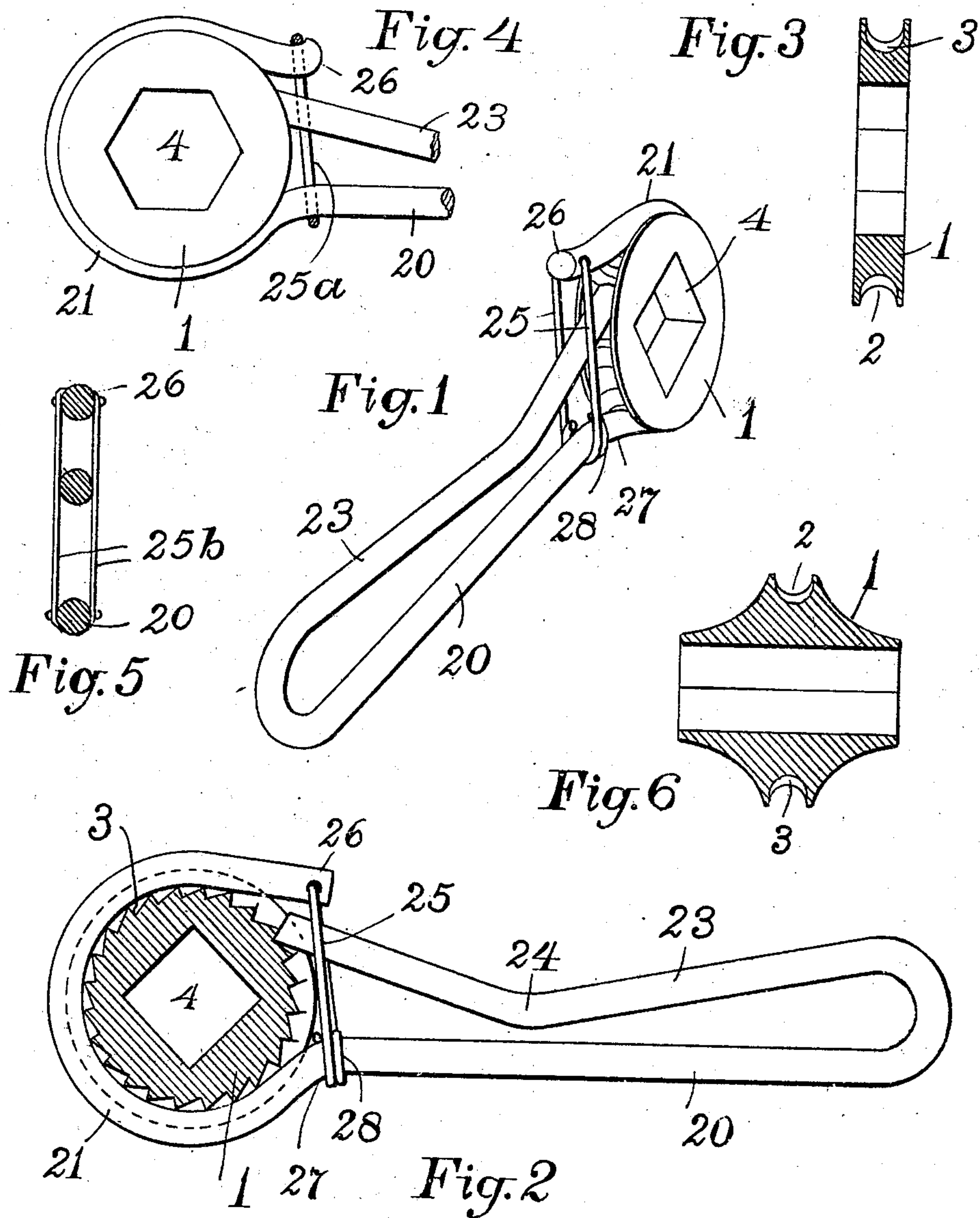


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 RATCHET WRENCH.
 APPLICATION FILED NOV. 8, 1906.

928,719.

Patented July 20, 1909.
 2 SHEETS—SHEET 1.



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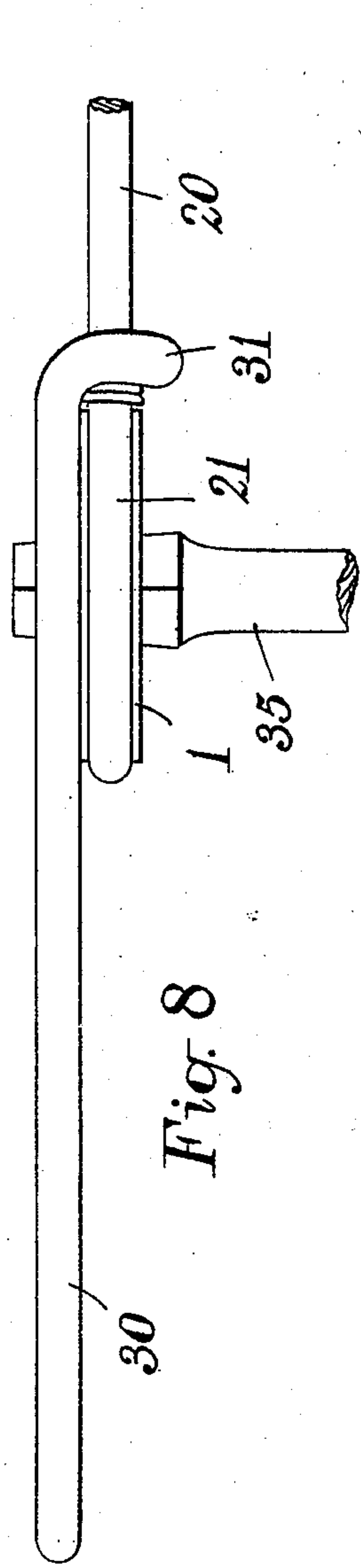


Fig. 8

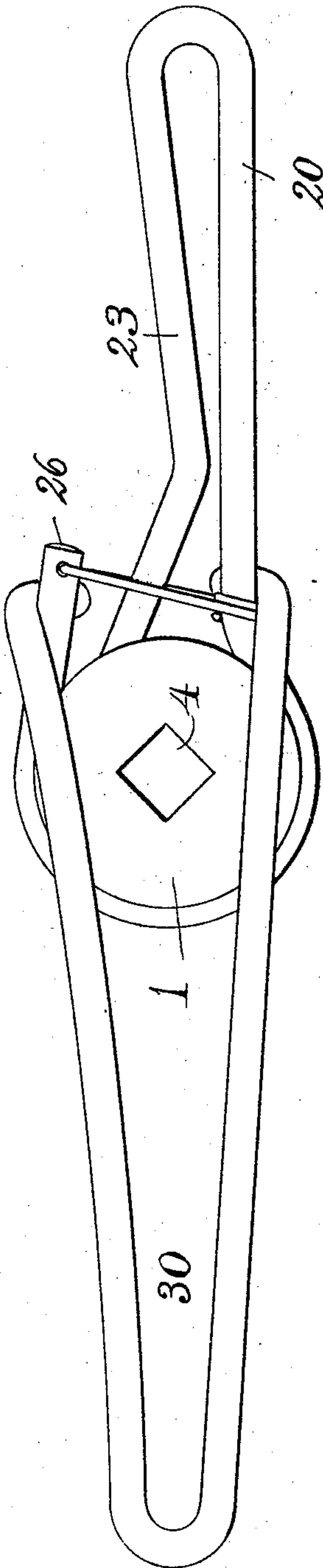


Fig. 7

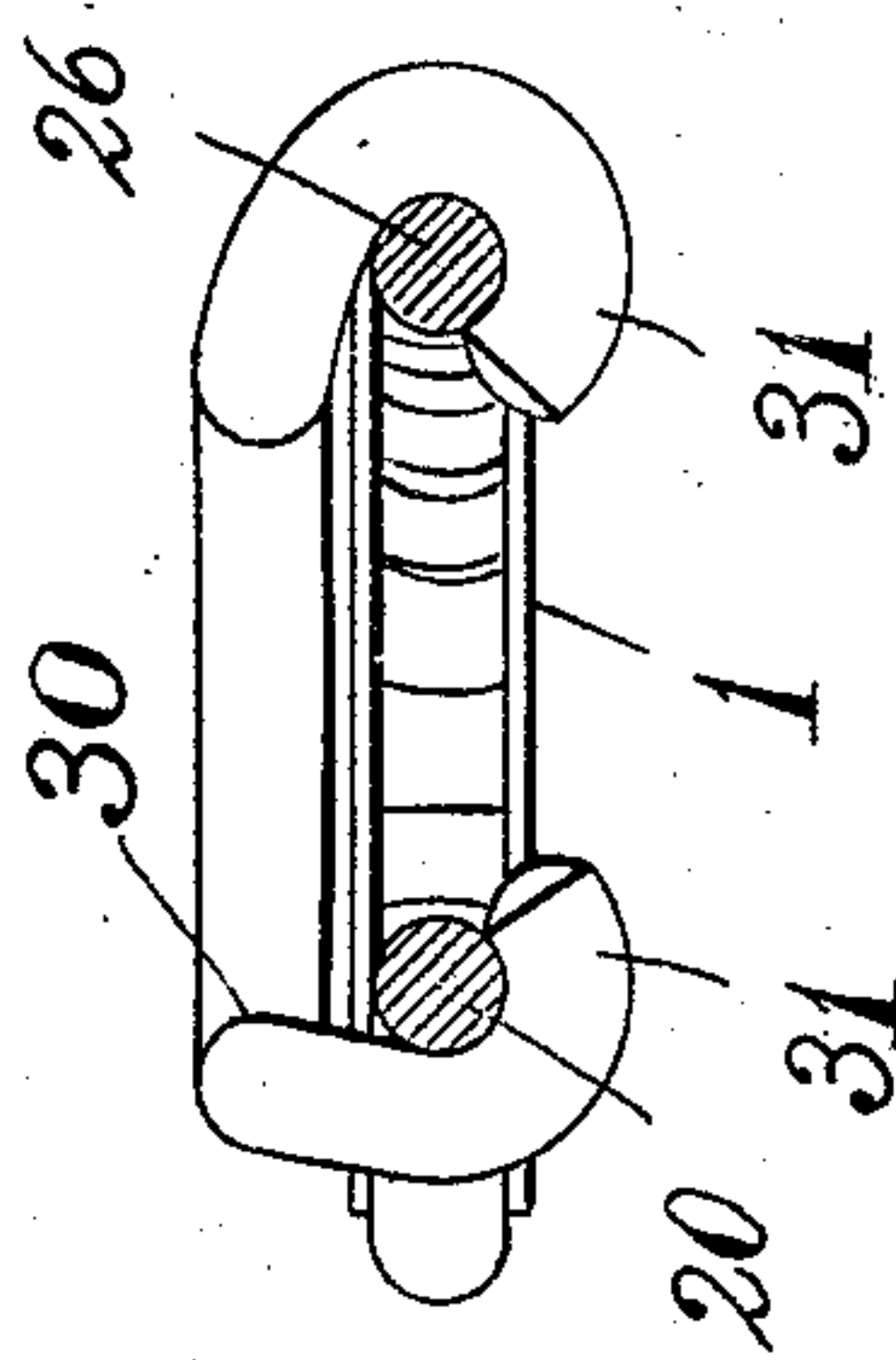


Fig. 9

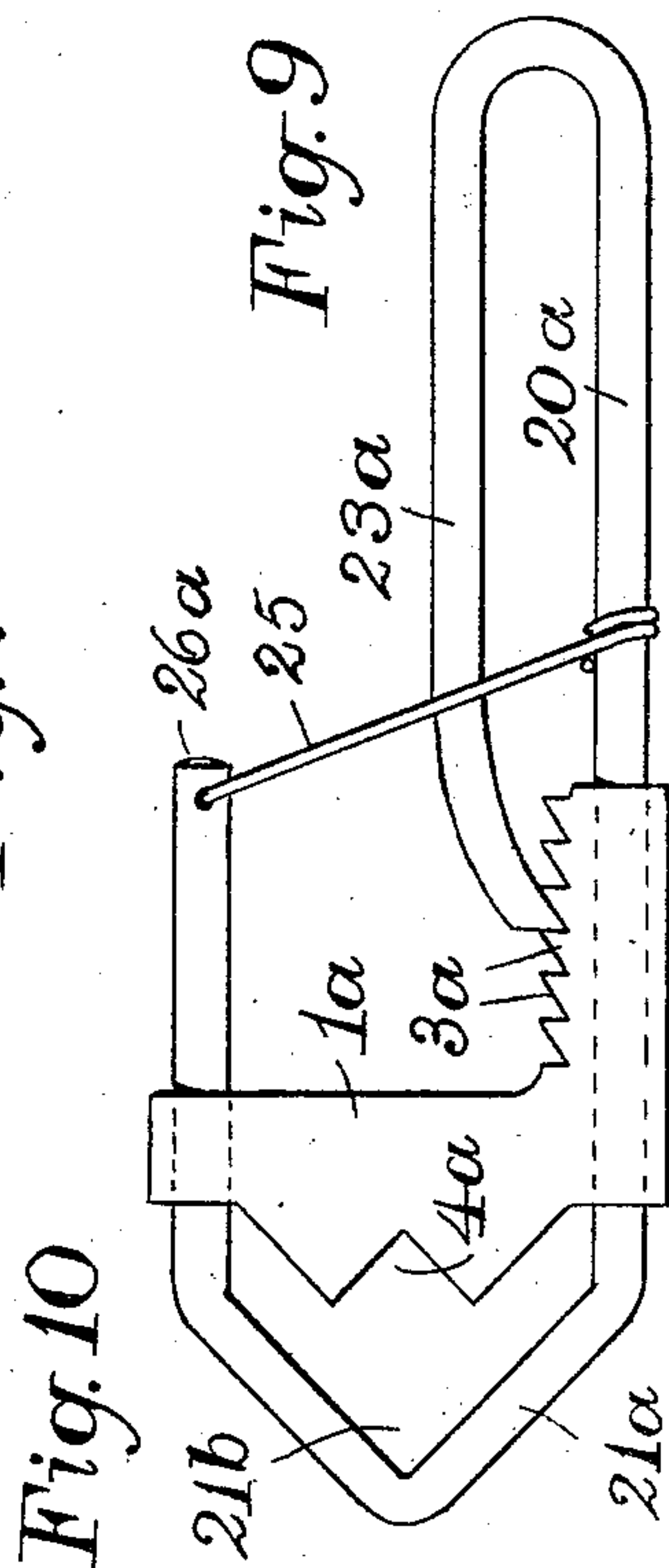


Fig. 10

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UNITED STATES PATENT OFFICE.

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RATCHET-WRENCH.

No. 928,719.

Specification of Letters Patent.

Patented July 20, 1909.

Application filed November 8, 1906. Serial No. 342,496.

To all whom it may concern:

Be it known that I, FREDERICK E. WALDEN, a citizen of the United States, and a resident of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Ratchet-Wrenches, of which the following is a specification.

The object of this invention is the construction of a ratchet wrench of the smallest possible cost, consistent with durability and convenience in use, and which shall at the same time be neat and attractive in appearance. To this end I form the socket piece or head, with an annular groove within which are ratchet teeth, while the remainder of the parts are of wire rod bent to constitute handle, pawl and holder for the said head.

Referring to the drawings forming part of this specification, Figure 1 is a perspective view of the preferred form of the wrench complete. Fig. 2 is a side view of the same with the head in section. Fig. 3 is a transverse section of the head. Fig. 4 is a side view of the head portion showing a modified method of strengthening the head-receiving member. Fig. 5 is a transverse section showing two other modifications of the same. Fig. 6 is a sectional view of another form of head, one shaped to adapt the device for an axle wrench. Fig. 7 is a plan view of the device adapted for a tap-wrench. Fig. 8 is side view of same. Fig. 9 is a cross section of same. Fig. 10 is plan view of my adjustable wrench.

The wrench head 1 is circular in shape, with a socket of any desired shape, as square or hexagonal, and having in its periphery an annular groove 2 formed with ratchet teeth 3 in its bottom, as shown in Fig. 2. A wire rod is bent at one end to constitute a substantially circular bearing or seat for the head 1; such seat 21 fitting the groove 3 sufficiently tight to retain the head in place, but not to interfere with its ready rotation therein. The remainder of said rod is bent over upon the section 20 and terminates in engagement with the ratchet teeth in the groove 2; said part 23 thus constituting the pawl by means of which the head is held from turning backward when the wrench is in use. By bending said section 23 at an obtuse angle as shown, its engagement with the ratchet teeth is made more perfect, and it resists much more strongly the working

strain to which the head is subjected. I prefer to have such obtuse bend 24 come almost in contact with the straight section 20, but not in actual touch, for the reason that should the pawl extremity become slightly bent or worn, its entrance between the ratchet teeth might be somewhat interfered with; while in heavy strains, the space allowed will not be enough to keep the pawl from bending toward, and be braced by, the straight section 20.

It is evident that the sections 20 and 23 constitute the handle of this wrench, and one which is smooth, light, strong and attractive.

After the head has been put in place, and the seat 21 bent into its groove, a link 25 is applied to connect the end 26 to the bend 27, and thereby prevent the section 21 from bending under the strain imparted by the pawl 23 in resisting rotation of the head. My preferable means for thus linking such parts consists of the wire 25 penetrating a suitable hole drilled transversely through the end 26, and having each extremity bent about the bend 27, as at 28 in Figs. 1 and 2. As shown in Fig. 1, this two-part link passes on opposite sides of the pawl and so insures that the latter cannot get out of place in the groove of the head. Another construction of link consists of a flattened ring 25^a brought over the handle of the wrench and snapped over the slightly hooked end 26, as shown in Fig. 4 where such ring is in section. A second modification is that wherein two strips of thin ribbon steel 25^b are riveted to opposite sides of the parts 20 and 26, as indicated in Fig. 5.

As illustrated by Fig. 3, the groove 2 is rounded to fit the round wire rod composing the bearing or seat 21, and the teeth 3 are similarly rounded. This insures a more thorough engagement of such teeth with the end of the pawl 23, and a more enduring wear to the parts.

In Fig. 6 is shown a head 1 laterally prolonged to constitute a carriage axle wrench; the remainder of the construction being unchanged.

It is evident that the form of ratchet wrench shown in Figs. 1 and 2 may be used in connection with a screw driver, a bit, or other tool to which a rotary motion is to be applied, by using a size of head which will fit the tool. For instance, a screw driver blade being inserted in the socket of a size not to

turn therein, the said screw driver can be given an intermittent rotation by the proper oscillation of the wrench handle. By reversing the wrench to present the opposite flat face upward, the screw driver can be then turned in the opposite direction by a similar oscillation of the wrench handle.

To adapt the device for use as a tap-wrench, I provide an additional handle 30 adapted to project in opposition to the handle 20 of the wrench. Such handle consists of a length of rod doubled upon itself and having its ends formed with hooks 31 adapted to be engaged with the parts 20 and 26 as shown in Figs. 7, 8 and 9. By means of this auxiliary, removable handle, the wrench can be used as a tap-wrench; the two oppositely projecting handles permitting of simultaneous pulling and pushing in order to better turn the tap, as 35 in Fig. 8, which is inserted in the wrench-socket 4.

Another modification of my invention is that whereby I employ the same general scheme of handle, pawl and head-holder formed from a single length of wire rod, in the construction of an adjustable wrench capable of having its jaws varied to take in different sizes of bolt-heads. Here the handle 20^a is formed with a seat 21^a having a right-angled bend 21^b to constitute one of the opposing jaws of the wrench; the other opposing jaw 4^a being a recess in the head 1^a slidable along the handle 20^a and the terminal section 26^a. Along a portion of this jaw are formed ratchet teeth 3^a engaged by the pawl 23^a. A doubled link 25 joins the end of the terminal section 26^a to the handle 20^a and so prevents the said section 26^a from bending away from the handle-section, and also keeps the pawl in place so that it cannot slip sideways out of engagement with the teeth 3^a.

What I claim as my invention and for which I desire Letters Patent is as follows, to wit;—

1. A wrench comprising an elongated member bent to form a socket and a handle, and a head rotatably arranged in said socket and having a ratchet, said member having an end disposed to form a dog adapted to engage said ratchet.

2. A wrench comprising an elongated bar bent to form a handle, a socket, and adjacent to said socket a dog, and a head having an annular recess, said head being rotatably arranged in said socket whereby said recess engages said bar at said socket, said recess having formed therein a ratchet, said dog being adapted to engage said ratchet, said handle having means for holding said head in position, and said head being provided with jaws.

3. The combination with a movable member having teeth, of a length of metal rod having one terminal section movably holding said member, an intermediate section thereof

composing a handle, and the other terminal section bent over on said handle and engaging said teeth.

4. The combination with a circular member having an annular groove therein, of a length of rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and the other terminal section bent over on said handle-section and disposed for engagement within said groove for preventing the rotation in one direction of said member within the first-named terminal section, but to permit such rotation in the opposite direction, the last-named terminal section being adapted to resiliently swing away from said handle for the purpose of engaging a new point of said circular member.

5. The combination with a circular member having an annular groove therein, and teeth in said groove, of a length of rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and the other terminal section bent over on said handle-section and disposed to engage said teeth in said groove, the last-named terminal section being adapted to resiliently swing away from said handle for the purpose of engaging a new point of said circular member.

6. The combination with a circular member having an annular groove therein, of a length of metal rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and the other terminal section bent over on said handle-section and disposed for engagement with said groove for preventing the rotation in one direction of said member within the first-named terminal section but to permit such rotation in the opposite direction; the extremity of the first-named terminal section being connected with the handle-section in a manner to prevent such parts bending apart under the strain of use.

7. The combination with a circular member having an annular groove therein and teeth in said groove, of a length of metal rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and the other terminal section bent over on said handle-section and disposed to engage said teeth in said groove, and a double link joining the end of the first-named terminal section to said handle and straddling the other terminal section.

8. The combination with a circular member having an annular groove therein and teeth in said groove, of a length of metal rod having one terminal section thereof embracing said member in said groove, an interme-

diated section radiating from said member to form a handle, and the other terminal section bent over on said handle-section and disposed to engage said teeth, and a wire link inserted through a transverse hole formed in the end of the first-named section and having its ends wrapped about the handle section at its juncture with the first-named section.

9. The combination with a circular member having ratchet teeth in its periphery, of a single length of rod having one terminal section thereof rotatably embracing said member, an intermediate section radiating from said member to form a handle, and the other terminal section bent over on said handle-section to engage said teeth; the last-named section being formed with an obtuse bend to present its extremity more tangentially to said member.

10. The combination with a circular member having an annular groove therein and teeth in said groove, of a length of metal rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and the other terminal section bent over on said handle-section to engage said teeth; the last-named section being formed with an obtuse bend to present its extremity more tangentially to said member.

11. The combination with a circular member having an annular groove therein and teeth in said groove, of a length of metal rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and the other terminal section bent over to engage said teeth; said rod being

circular in cross-section, and said groove and teeth being rounded to correspond with said rod.

12. The combination with a ratchet wrench comprising a circular member formed with teeth in its periphery, and a length of metal rod having one terminal section thereof embracing said member in said groove, an intermediate section radiating from said member to form a handle, and a dog engaging said member, of a length of rod bent double and formed with terminal hooks adapted to engage said handle and first-named terminal section.

13. A wrench comprising a round metallic rod bent to form a socket and a handle, a head having an annular groove rotatably supported in said socket, said groove being half-round to fit said rod and having ratchet teeth therein formed with half-round faces, and a pawl engaging said teeth.

14. A wrench comprising an elongated member bent to form a socket and a handle, a head rotatably arranged in said socket and having teeth, a dog carried by said handle in engagement with said teeth, and a link joining the end of said socket with said handle; said link being double and acting both to confine between its two parts the said dog, and also to prevent said socket from bending away from the handle under the strain of use.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 2nd day of November, 1906.

FREDERICK E. WALDEN

Witnesses:

A. B. UPHAM,
F. G. TILTON.