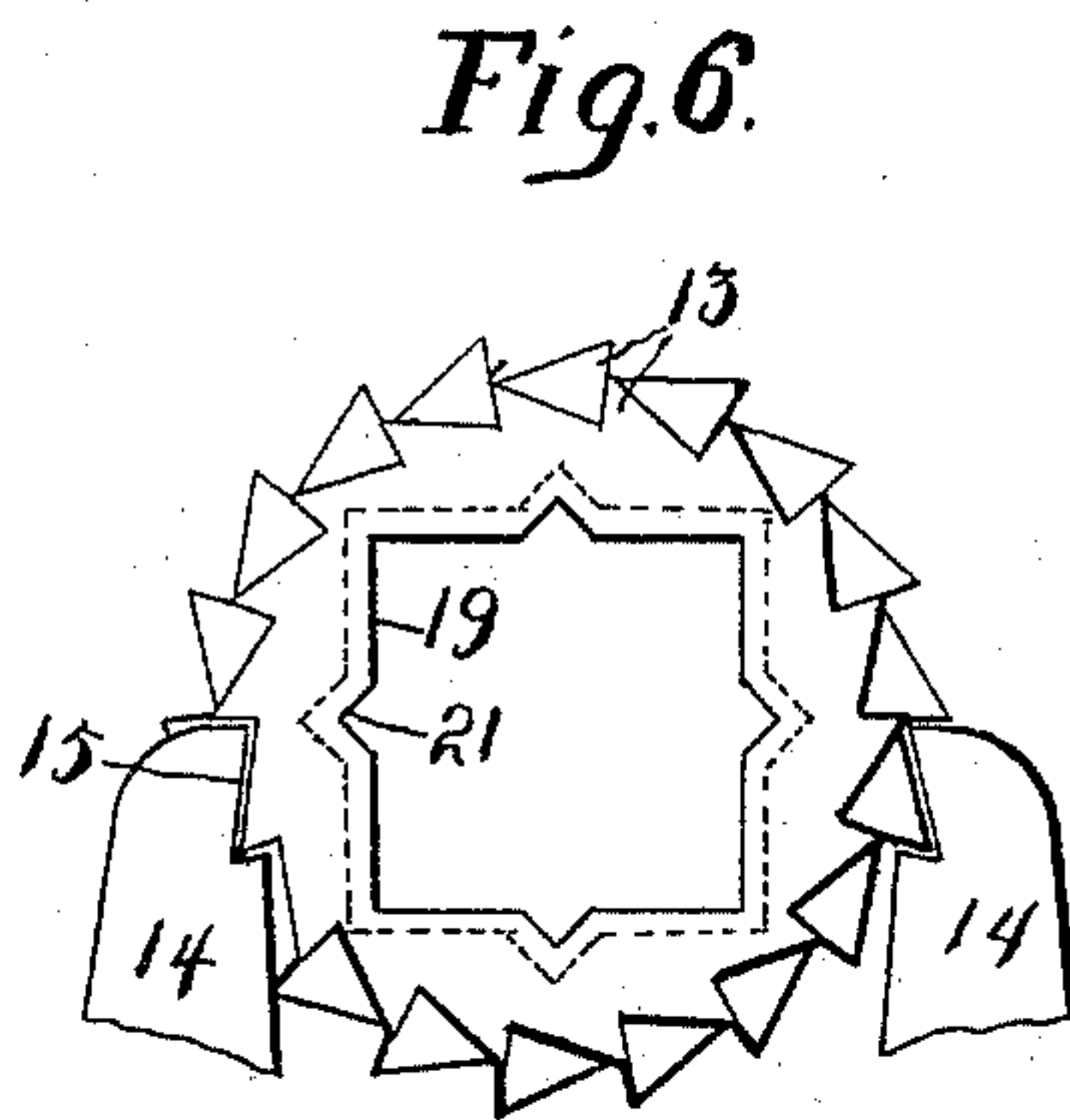
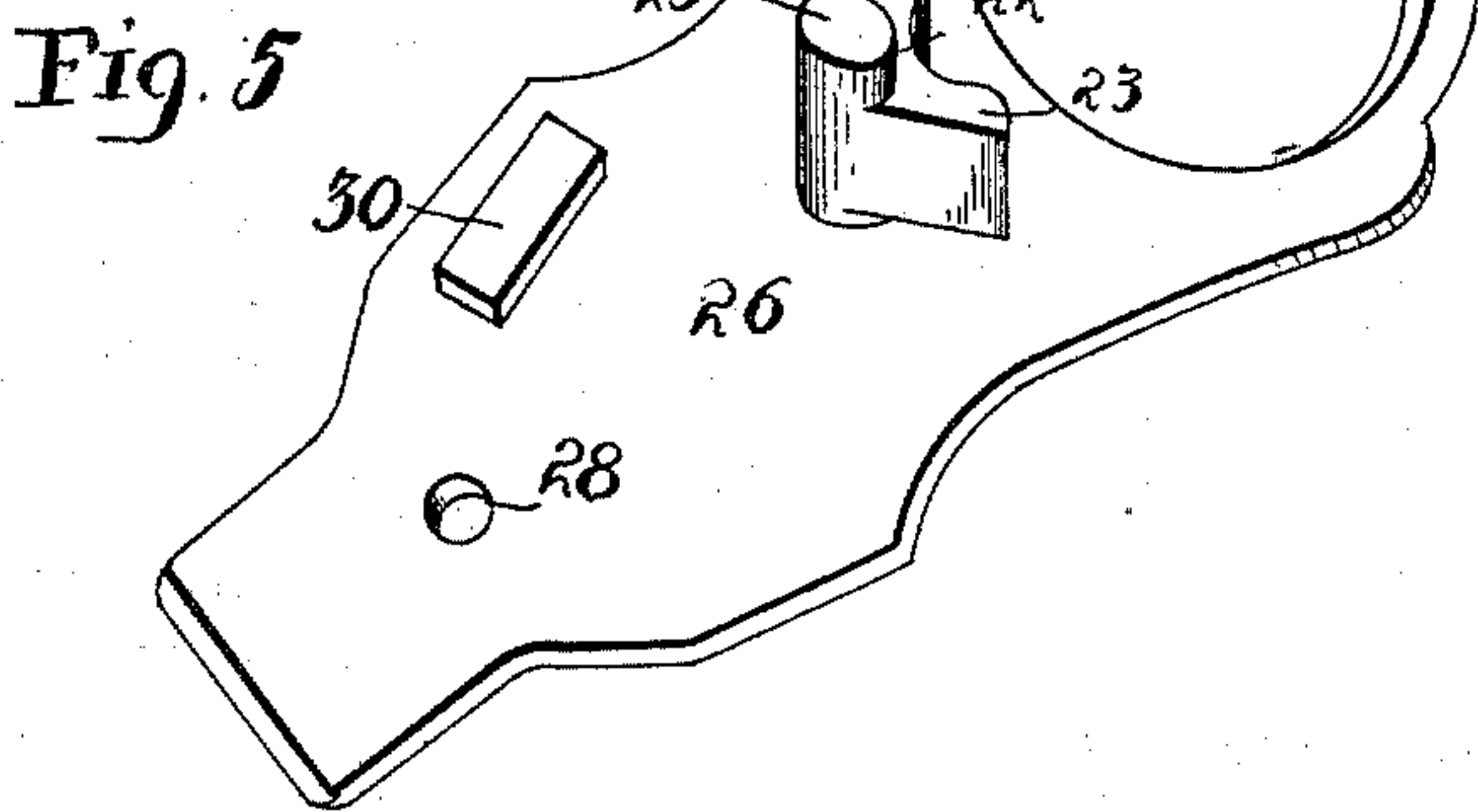
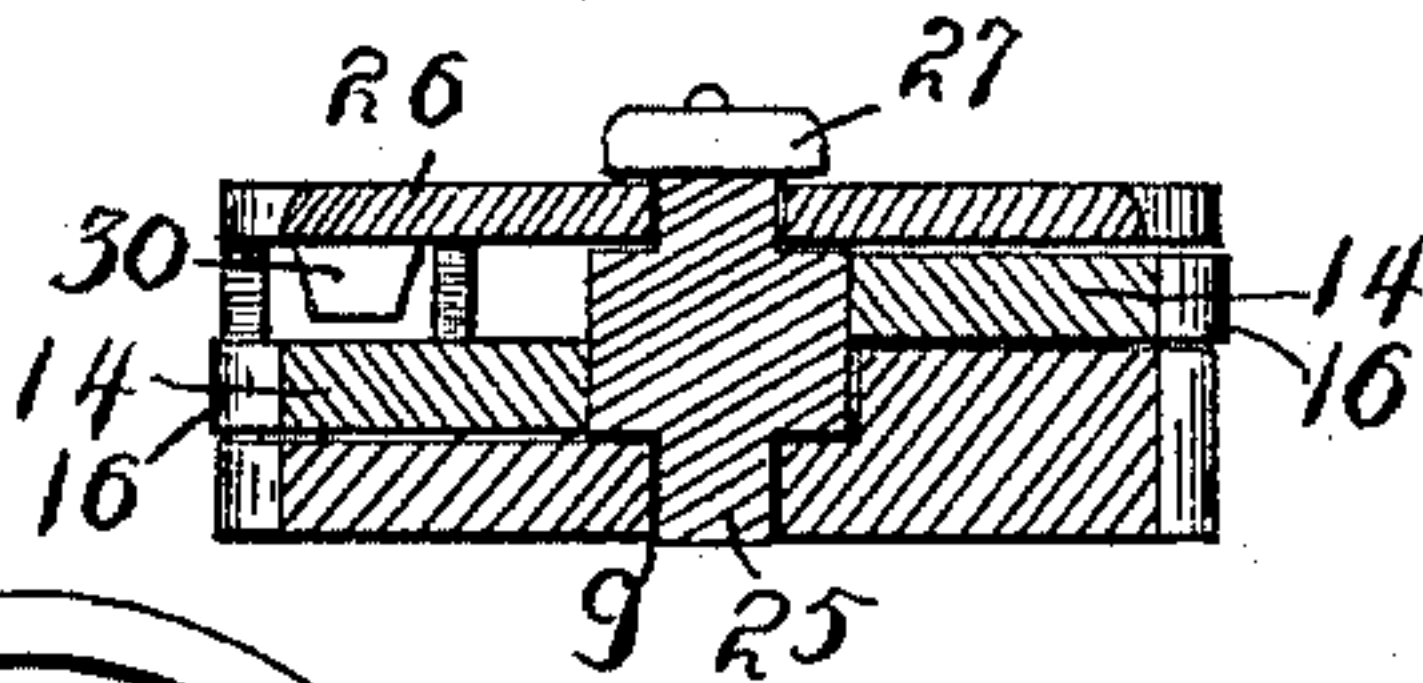
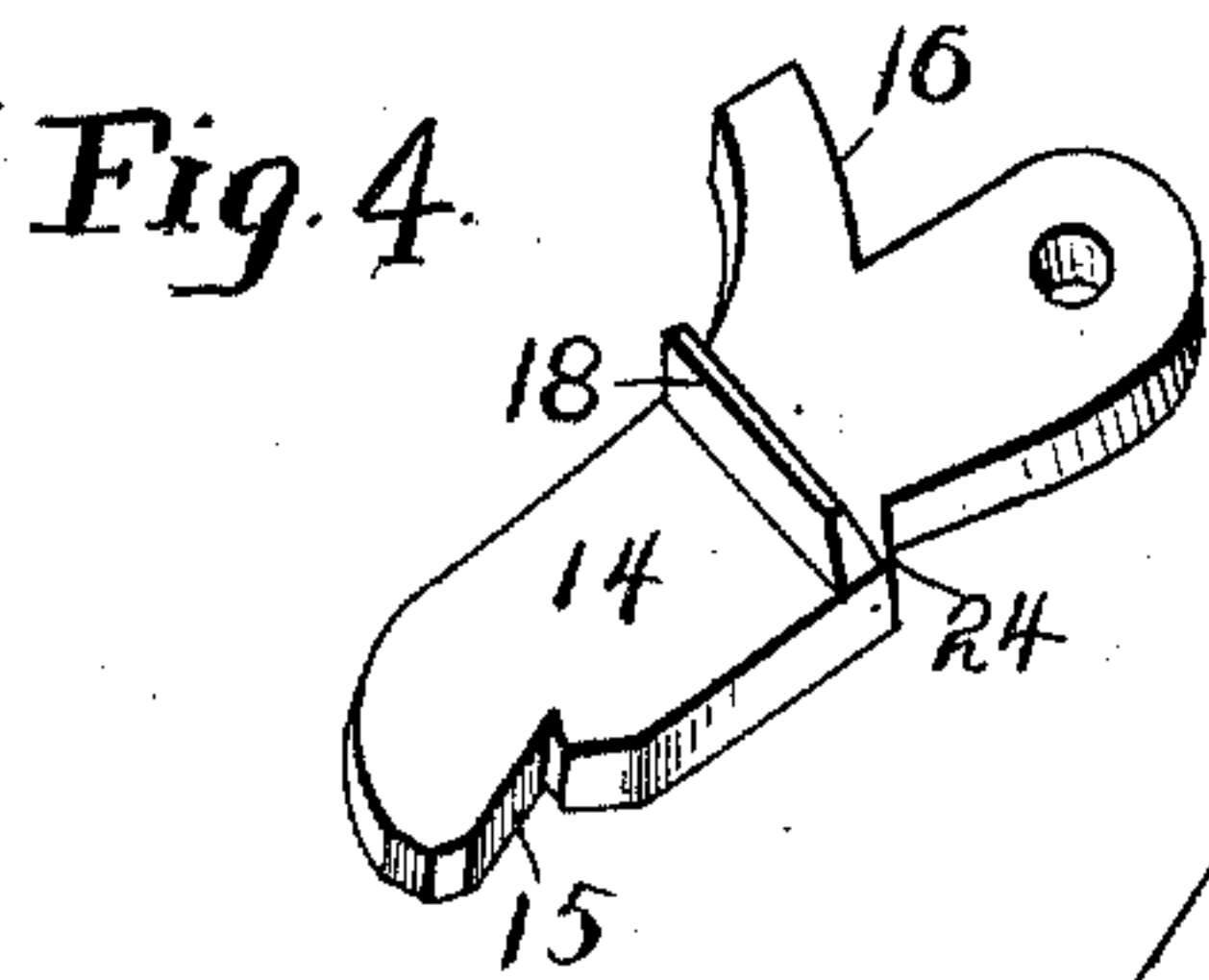
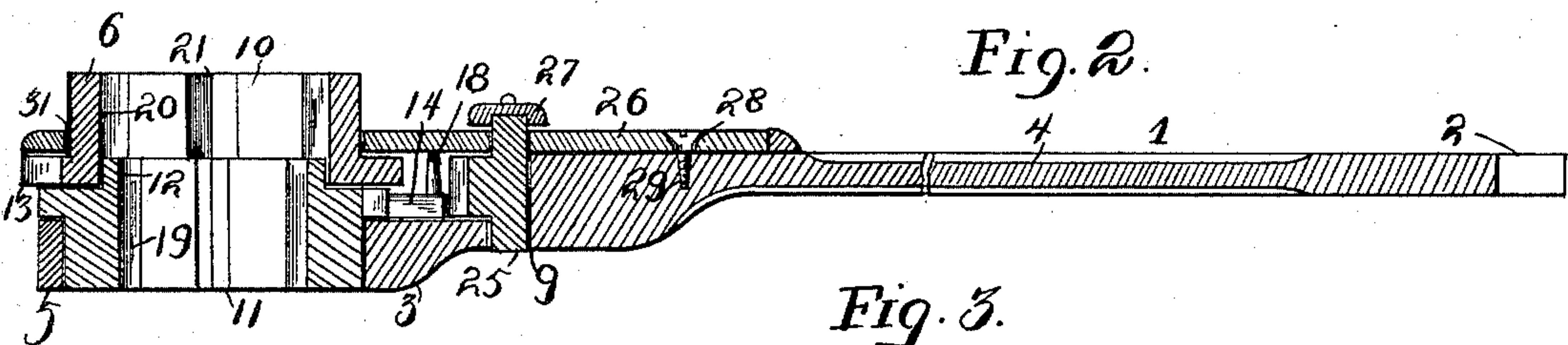
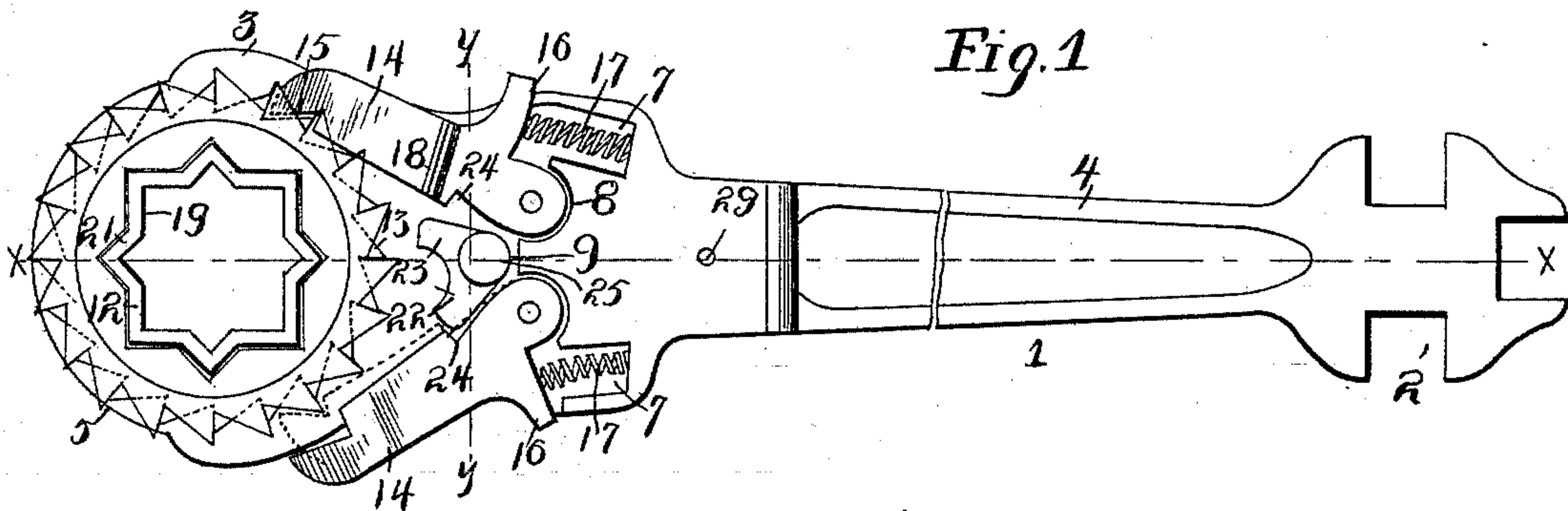


(No Model.)

J. A. MILLER.
COMBINED RIGID AND RATCHET WRENCH.

No. 485,290.

Patented Nov. 1, 1892.



Witnesses
A. A. Eicks
Ed. E. Lingau

Inventor
John A. Miller.
By his Attorneys Higdon & Higdon

UNITED STATES PATENT OFFICE.

JOHN A. MILLER, OF ST. LOUIS, MISSOURI.

COMBINED RIGID AND RATCHET WRENCH.

SPECIFICATION forming part of Letters Patent No. 485,290, dated November 1, 1892.

Application filed January 4, 1892. Serial No. 416,969. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. MILLER, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in a Combined Rigid and Ratchet Wrench, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in a combined rigid and ratchet wrench; and it consists in the novel arrangement and combination of parts, as will be more fully hereinafter described, and designated in the claim.

In the drawings, Figure 1 is a plan view showing the inner construction of a wrench constructed according to my invention, having the top plate removed therefrom. Fig. 2 is a longitudinal vertical section taken on the line xx of Fig. 1. Fig. 3 is a vertical cross-section taken on the line yy of Fig. 1. Fig. 4 is a perspective view of one of the pawls detached. Fig. 5 is a perspective view of the under surface of the detachable plate, having the cam for operating the pawls attached thereto; and Fig. 6 is a top plan view of the socket detached, showing the pawls in connection with the same.

The object of my invention is to construct what is commonly termed a "ratchet-wrench"—that is, one in which the handle is movable independent of the socket which receives the nut to be turned.

My invention is especially constructed to lock the socket, if so desired, against movement, and by the movement or manipulation of a certain operating device said socket can be allowed to rotate in one direction and lock in the opposite.

Referring to the drawings, 1 represents a casting, one end of which is provided with a cluster of different-sized apertures, such as 2, for receiving various sizes of nuts, and such nuts cannot be turned by the remaining parts of the wrench.

3 represents that portion of the casting to which the movable parts of my invention are attached, and which portion, also, is of sufficient size and strength to accommodate itself for the purpose.

4 represents an operating-handle, which is formed in said casting intermediate of the wrench and by means of which the entire wrench is manipulated and turned.

5 represents a circular aperture, which is formed in the portion 3 of the casting for receiving one end of the socket 6, which is also round and is adapted to loosely turn in said aperture when the wrench is operated as a ratchet-wrench. The portion 3 of the casting is also provided with apertures 7, and also with rounded depressions 8 in close proximity to the apertures 7, and about the center of the said extension and in proximity to the apertures and depressions above described is formed an opening 9 in the said casting for receiving the lower ends of the double cam, the construction and operation of which will be hereinafter more fully described. The socket 6 is composed of two sections 10 and 11, the lower of said sections, or that designated by 11, having an angular extension 12, which extension is adapted to fit in the angular opening formed in the upper section 10 of the socket 6, thereby locking the sections against movement independent of one another. The two sections of the socket are each provided with external ratchet-teeth 13, and when the sections are united the said ratchet-teeth will be brought in contact; or, in other words, the ratchet-teeth formed upon one section will rest upon the ratchet-teeth formed upon the adjoining section of the socket, premising, however, that the teeth formed in one socket are arranged opposite to those formed in the other, by which construction the socket is either locked against movement or allowed to turn in either direction, as may be desired.

14 represent the pawls which I employ, which are similarly constructed and are two in number, one for each set of ratchet-teeth formed in the socket. The engaging ends of said pawls are provided with angular depressions 15, by which construction the teeth formed in the said socket are allowed to ride in one direction and against movement in the opposite direction. Within the apertures 8, or, more properly, the depressions, the pawls 14 are loosely pivoted and are adapted to be operated upon independent of one another by the mechanism, as hereinafter more fully set forth. The pawls 14 are each provided with extensions 16, which project beyond the edge of the casting for manipulating the said pawls independent of the mechanism employed for that purpose and against said extension coil-springs 17 bear for normally pressing the engaging ends of the pawl against the teeth

formed upon the socket 6, premising, however, that said springs are properly inserted in the apertures 7, formed in the casting, as shown in Fig. 1. Before proceeding further
 5 it will be well to state that the pawl which engages the lower set of ratchet-teeth formed on the socket is pivoted in the casting a little lower than the pawl which engages the upper ratchet-teeth of said socket, and consequently
 10 said pawl, that is located a little lower, is provided with an upward extension 18, which (when the parts are united or the top plate placed upon the wrench) said extension bears upon the top plate, whereby said last-named
 15 pawl will always be held in its proper position and relation with its corresponding ratchet-teeth formed upon the socket. Referring more specifically to the interior construction of the socket, or that portion which receives
 20 the nut to be turned, I construct the said socket so that it will receive nuts of various sizes.

19 represents a socket, or, more properly, a square opening formed in the socket, and
 25 a similar opening, which is a little larger in dimensions and which is located immediately above the first-named opening 19, said opening receiving nuts of different sizes. The sides of these openings are each provided
 30 with V-shaped depressions 21, by which construction nuts of smaller sizes may be received without in any way adjusting the socket to receive them. In placing the socket upon a nut to be turned the nut will find its
 35 own socket, and by turning the wrench the nut desired to be turned will be held rigidly within said socket. However, I do not wish to claim, broadly, the construction of the cluster of openings formed in the socket to
 40 receive nuts of different sizes, as such has been already patented by myself, and therefore I shall not describe said construction more minutely than above stated.

22 represents a double cam, which is V-
 45 shaped in plan, having arms 23, which are adapted to be brought in contact with the pawls 14 when the said cam is moved, as hereinafter more specifically described. The said
 50 pawls 14 are each provided with angular cut-away portions 24, which are adapted to be received by the arms 23 of the cam when the said cam is turned in the position, as shown in Fig. 1 of the drawings, for disengaging
 55 either of the said pawls. The said cam is provided with bearings 25, the lower one of which is adapted to loosely turn in the opening 9, formed in the casting, and the opposite bearing adapted to project through an opening
 60 formed in the plate 26, thereby allowing the said cam to be turned when so desired and yet hold the same in its proper position and relation with the pawls. To the bearing that projects above the plate 26 is secured an operating-knob 27, by means of which the said
 65 cam is manipulated in carrying out my invention.

26, as above referred to, represents a removable plate, which holds the detachable parts of the wrench in their proper position, and is secured to the casting 1 by means of a
 70 suitable screw or other like device, which is passed through the opening 28, formed in the said plate, and screwed into the screw-threaded opening 29, formed in the casting 1. The
 75 said removable plate 26 is provided with an extension 30 in the shape of a block, which is adapted to fit in one of the apertures 8, formed in the casting, or, to be more specific, in the aperture corresponding to the pawl,
 80 which engages the lower set of ratchet-teeth formed on the socket. The outline of the movable plate 26 conforms in shape to the outline of the portion 3 of the casting and is provided with an opening 31, which is circular
 85 in form and which opening is adapted to receive the upper rounded portion of the socket 6, premising, however, that the said socket will freely move within the said opening, thereby holding said socket in a rigid
 90 position and forming a bearing at that portion of the wrench for the said socket. When it is desired to use the socket rigidly with the remaining portion of the wrench, the two pawls
 95 14 are not operated upon in any way, allowing the engaging ends of the said pawls to engage with the teeth formed upon the socket. However, when it is necessary to use the wrench in one direction, or, in other words, to
 100 turn the nut without removing the wrench from said nut, either of the said pawls may be thrown out of engagement with the ratchet-teeth formed upon the socket, allowing the said wrench to be turned in one direction independent of the socket.

Thus it will be seen that the wrench above
 105 described can be operated either right-handed or left-handed, which entirely depends upon the direction in which the cam 22 is turned.

Having fully described my invention, what I claim is—

The herein-described wrench, consisting of a handle 1, formed at one end with a circular opening 5, a socket 6, disposed in the latter and consisting of two sections 10 and 11, the
 110 latter of which having an angular extension 12, fitting within the corresponding opening of the section 10, said sections being provided with reversely-arranged ratchet-teeth 13,
 115 pawls 14, engaging the respective series of said teeth, a cam 22, having arms 23, adapted to engage the pawls, and a removable cap-plate 26, provided with an opening for the reception of the outer end of the socket-section 10, all arranged and adapted to operate substantially as and for the purpose set forth.
 120 125

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. MILLER.

Witnesses:

C. F. KEELER,
 ALFRED A. EICKS.