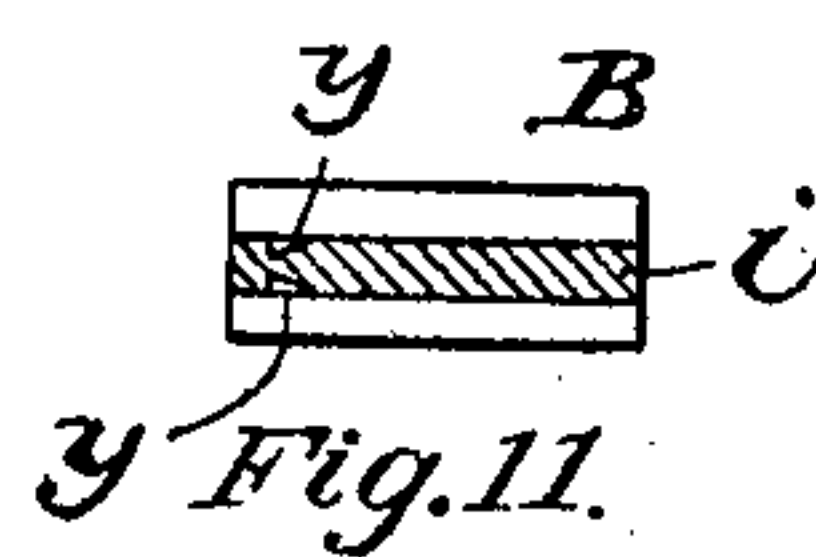
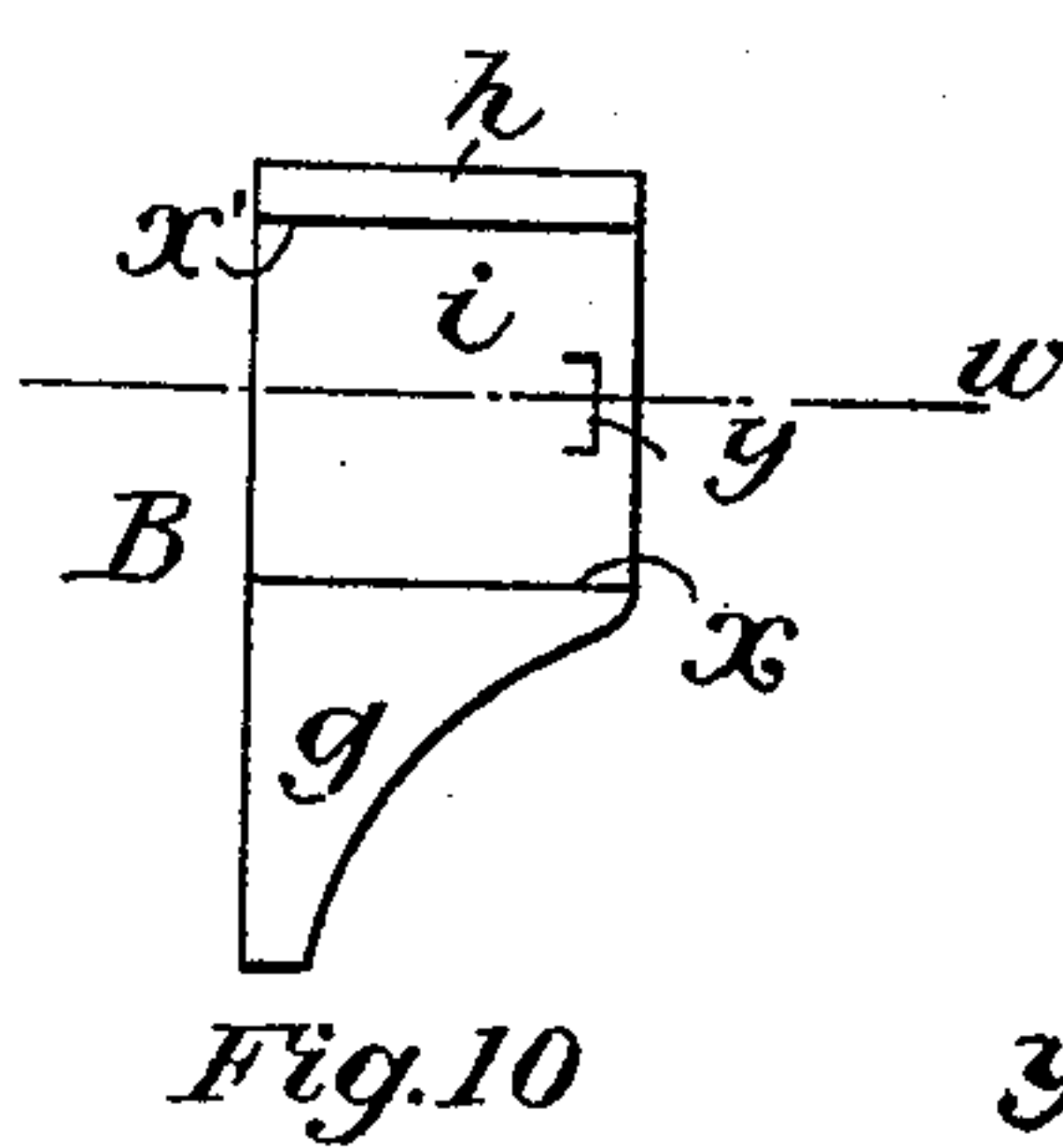
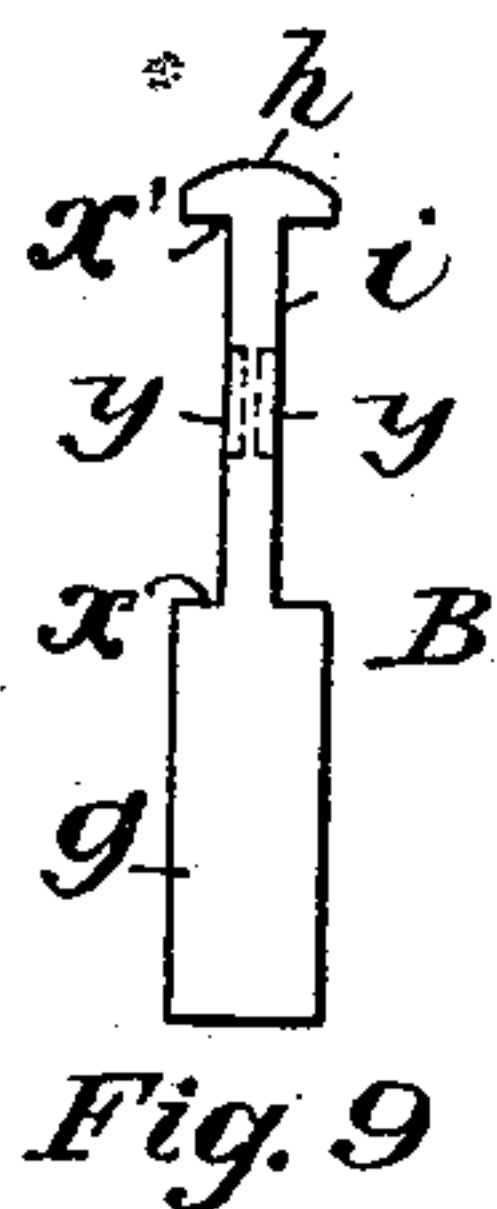
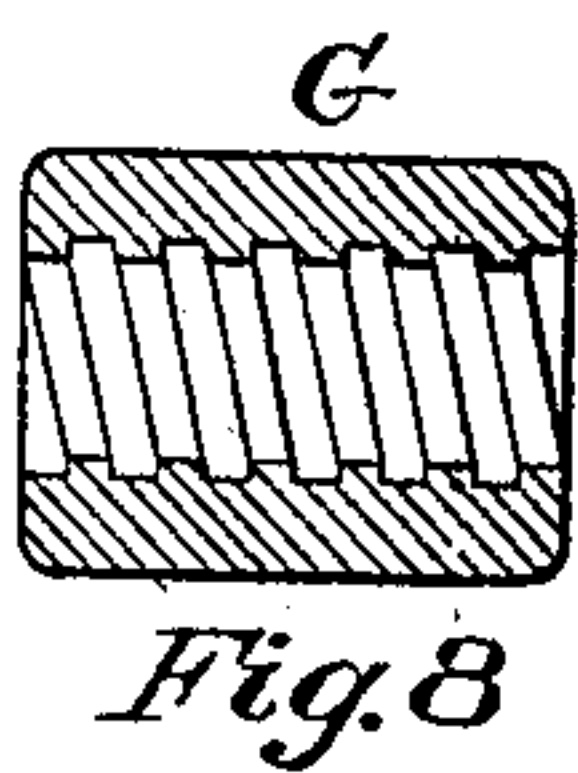
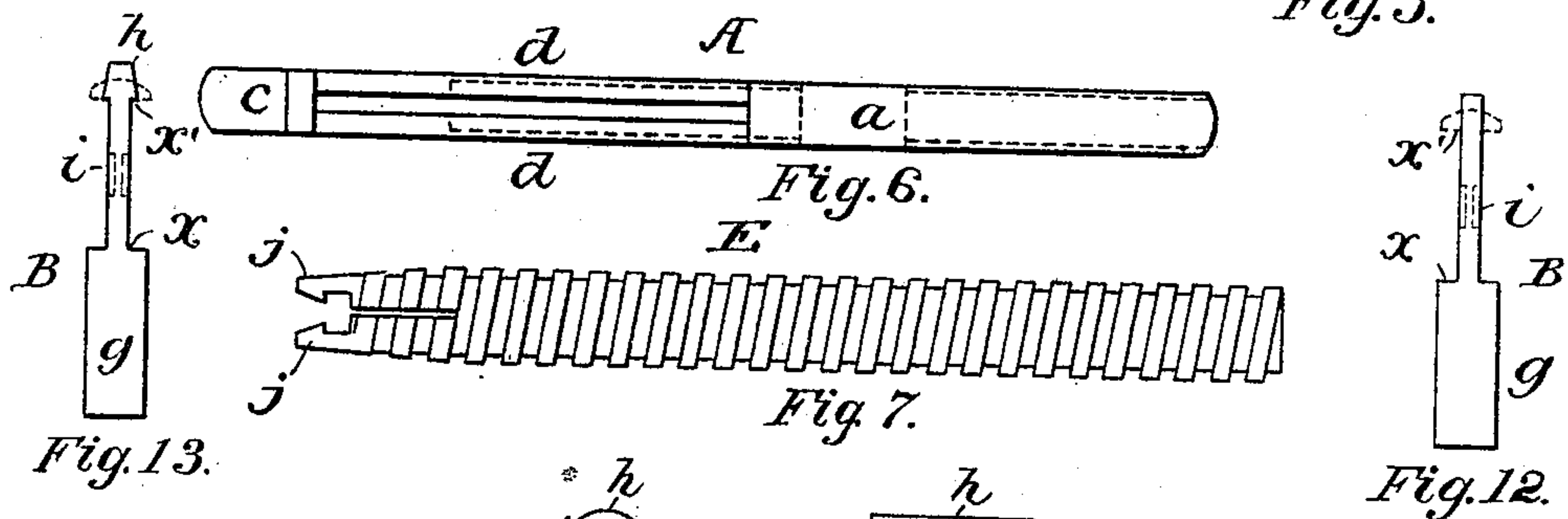
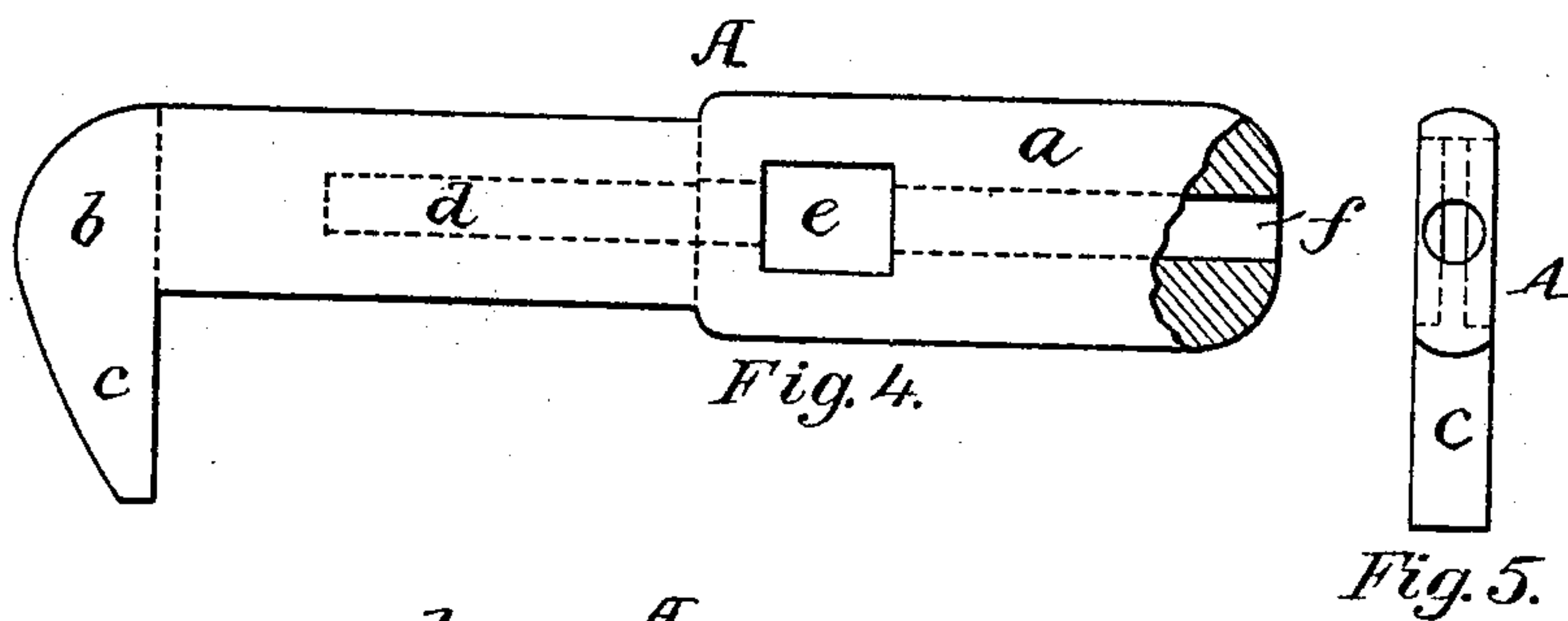
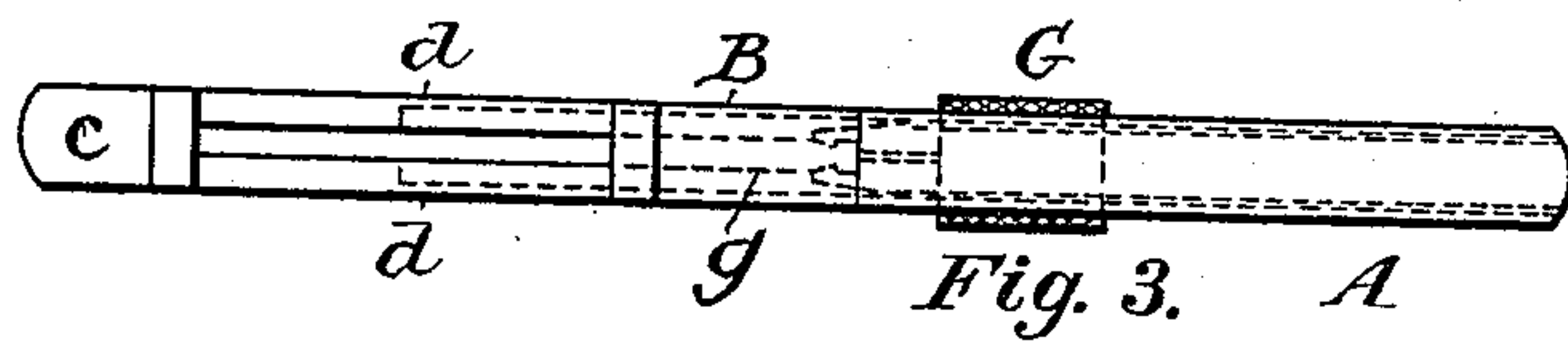
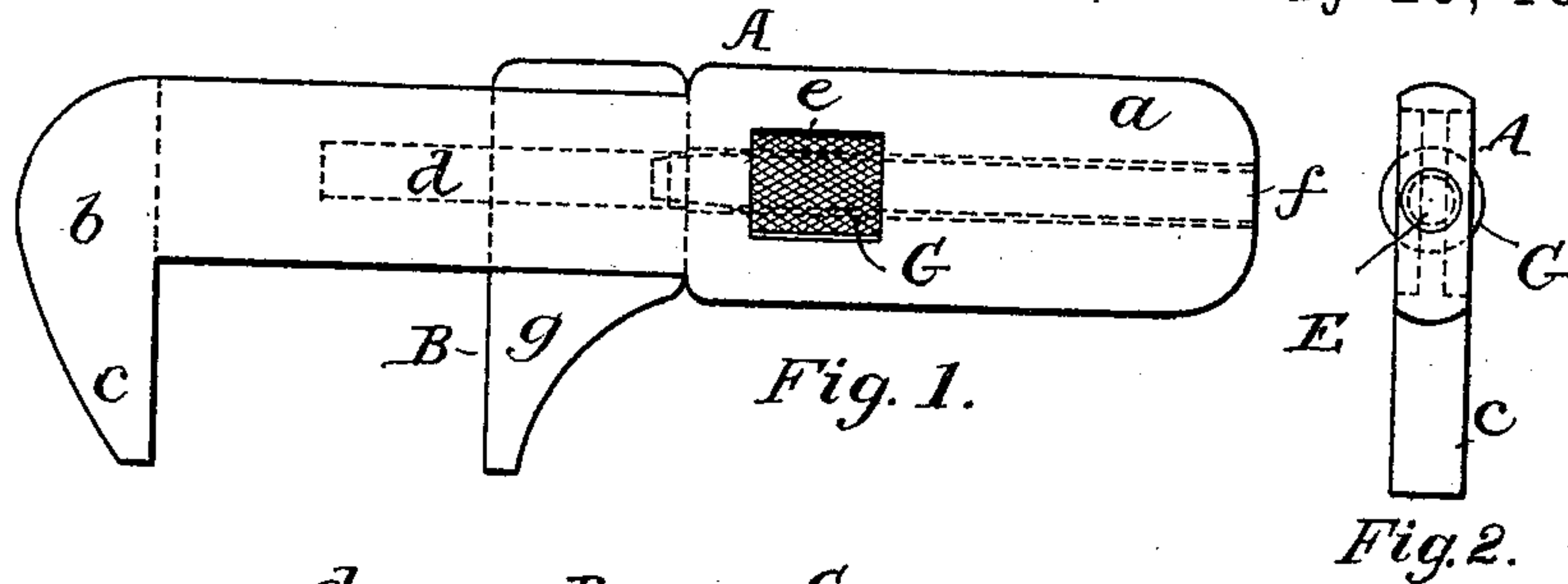


(No Model)

S. W. WARDWELL, Jr.
WRENCH.

No. 583,347.

Patented May 25, 1897.



WITNESSES:

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WRENCH.

SPECIFICATION forming part of Letters Patent No. 583,347, dated May 25, 1897.

Application filed July 3, 1896. Serial No. 598,003. (No model.)

To all whom it may concern:

Be it known that I, SIMON W. WARDWELL, Jr., a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Wrenches, of which the following is a specification.

The object of my invention is to secure a wrench of simple construction, great strength and durability, neat finish, and handy to handle, to which end I construct the same of a limited number of parts in such manner as to avoid the riveting and assembling of different portions, and the weakness and expense attending such construction, all as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a side view of my improved wrench. Fig. 2 is an end view. Fig. 3 is an edge view. Fig. 4 is a side view of the body member, partly in section. Fig. 5 is an end view of the body member. Fig. 6 is an edge view of the body member. Fig. 7 is an exterior view of the threaded rod for connection with the movable member. Fig. 8 is a section of the nut for operating the threaded rod. Fig. 9 is an edge view of the movable member. Fig. 10 is a side view of Fig. 9. Fig. 11 is a section on the line *w*, Fig. 10. Figs. 12 and 13 are views illustrating the manufacture of the movable member. Figs. 7 and 8 are drawn upon an enlarged scale.

The wrench consists of three main parts, the body member, the movable member, and the means for securing the movable member in place, which means may also serve to adjust the movable member.

The body member A consists of the handle portion *a*, the head *b*, which is extended to one side to constitute the jaw *c*, and the intermediate shank, consisting of two separated parallel plates *d d*. This member A is made of one homogeneous piece of metal having the outline shown in Fig. 4, formed by cutting the piece by dies from a plate or in any other suitable manner. The blank of the shape shown is then operated upon by a milling-tool to slot the shank along its entire length between the head and the handle form-

ing the two separated plates *d d*, and the handle portion is then punched to form a rectangular opening *e*, and is bored longitudinally to form a longitudinal recess *f*, extending not only through the handle crossing the slot *e*, but also extending longitudinally along the inner faces of the plates *d d*, for the purpose described hereinafter.

The movable member B consists of a single piece extended at one side to form a jaw *g'* and reduced in thickness to form a web *i*, adapted to fit the space between the plates *d d*, the shoulders *x x'* on opposite edges of the web abutting against the opposite edges of the plates *d d* and constituting guides as well as bearings for the movable member permitting it to slide freely, but effectually resisting any strains or pressure tending to tilt the movable member and carry the operating-face of its jaw out of parallelism with the operating-face of the fixed jaw.

The movable member B may be made in different ways. For instance, it may be formed by drop-forging or otherwise, with the web *i* of greater width than the width of the plates *d*, as illustrated in full lines, Fig. 12, and after passing the web portion between the said plates the projecting portion of the web beyond the back of the shank is upset in any suitable manner to form the longitudinal back rib *h*, having the shoulder *x' x'*. Another method of forming the member B is illustrated in Fig. 13, where a back rib is formed in the first instance upon the edge of the web, the said back rib, however, being narrow, with tapering faces, constituting a wedge which, when forced between the plates *d d*, springs them apart until the rib passes beyond the back edges of the plates, when they will spring back into position. The rib may then be upset to a thickness indicated in dotted lines, Fig. 13. Instead of either of the above modes the member *d* may be formed with its rib *h* in complete shape, as shown in Fig. 9. The plates *d d* of the shank may be spread apart for the passage of this rib and then forced back into proper position. Whatever may be the means adopted it will be seen that by the construction proposed the body member and the movable member of the wrench con-

sists simply of two pieces, each without any joints or rivets, so that it is possible to secure the maximum degree of rigidity, stiffness, and strength with the minimum amount of manipulation and labor in the manufacture.

The movable member may be slid into position and secured in any suitable manner by means of any of the usual securing devices employed in wrenches. I prefer, however, to make use of a securing or locking device, which is also a propelling device—as, for instance, a nut engaging with a threaded rod extending from the movable member. In order to reduce the number of parts and facilitate the manufacture, in such case I make use of a threaded rod E, which, as shown, is cylindrical, with the thread extending its entire length, the said rod extending through the opening *f* and through a nut G, fitting the slot *e*, the inner end of the rod connecting with the movable member. To facilitate such connection, the inner end of the rod is slit, forming two jaws *j j*, each with a beveled face terminating in a shoulder, and the web of the movable member is indented on opposite sides to form two shoulders *y y*, with which the shoulders of the jaws *j j* engage. The inner end of the rod is somewhat reduced in thickness, so that the parts may be assembled by inserting the screw-rod into the opening *f* and into the nut G, and then turning the nut to carry the rod onward, with the jaws on opposite sides of the web and gradually separating until their shoulders pass those of the web, when the jaws will spring inward and grip the web. The rotation of the nut will then serve as a means of carrying the screw-rod in one direction or the other and of holding the rod and the jaw fixedly in place after adjustment. Any strain or thrust tending to slide the jaw brings the end of the nut against the end of the slot *e*, which forms a solid unyielding abutment, permitting no play so the parts.

I am thus enabled to form the wrench, including the adjusting and locking means, of four pieces without the use of rivets or other fastenings, which pieces are capable of being shaped by machinery with a minimum amount of hand-labor for shaping, finishing, or assembling, securing a wrench of great strength and durability, neat in finish, and handy to handle.

It will be evident that by making the body portion, as described, in a single homogeneous piece the weakness due to faulty work in riveting or otherwise joining the parts of a composite structure is avoided, as is also the

marring of the surface, apt to occur in spreading the heads of rivets.

Without limiting myself to the precise construction and arrangements of parts shown, I claim—

1. In a wrench, the combination of a body member consisting of a handle, a head including the outer jaw and a shank slotted to form two parallel separated plates connecting the handle and head all in one homogeneous piece of plate metal, said handle being formed with a longitudinal recess extending entirely through it to the slot in the shank and with transverse openings which intersect the longitudinal recess, and a sliding member having a web extending between the separated plates, a screw extending through the longitudinal recess of the handle and having a yielding connection with the web and a nut within the transverse openings in the handle, substantially as described.

2. The combination in a wrench, of a body member consisting of a solid handle, head and connecting separated parallel plates all in one piece, a sliding member having a rod extended therefrom, the handle and plates longitudinally recessed to receive said rod, substantially as set forth.

3. In a wrench, the combination with the handle, shank and stationary jaw, the shank being formed of separated plates having longitudinal recesses in their inner faces, of a sliding member having a web extending between the plates, a screw within the longitudinal recess, connected to the sliding member and a nut engaging the screw, substantially as described.

4. In a wrench, the combination with the handle and stationary jaw, of a sliding member provided with shoulders, a rod having separated jaws engaging the shoulders of the sliding member and a retaining device for engaging the rod, substantially as described.

5. In a wrench, the combination with the handle and stationary jaw, of a sliding member provided with shoulders, a threaded rod provided with separated jaws having inclined faces and shoulders engaging those of the sliding member, and a nut engaging the rod, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIMON W. WARDWELL, JR.

Witnesses:

E. C. SMITH,
H. A. COOK.