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PATENTED FEB. 10, 1903.

T. D. MILLEA.  
COMBINATION TOOL.

APPLICATION FILED FEB. 27, 1902.

NO MODEL.

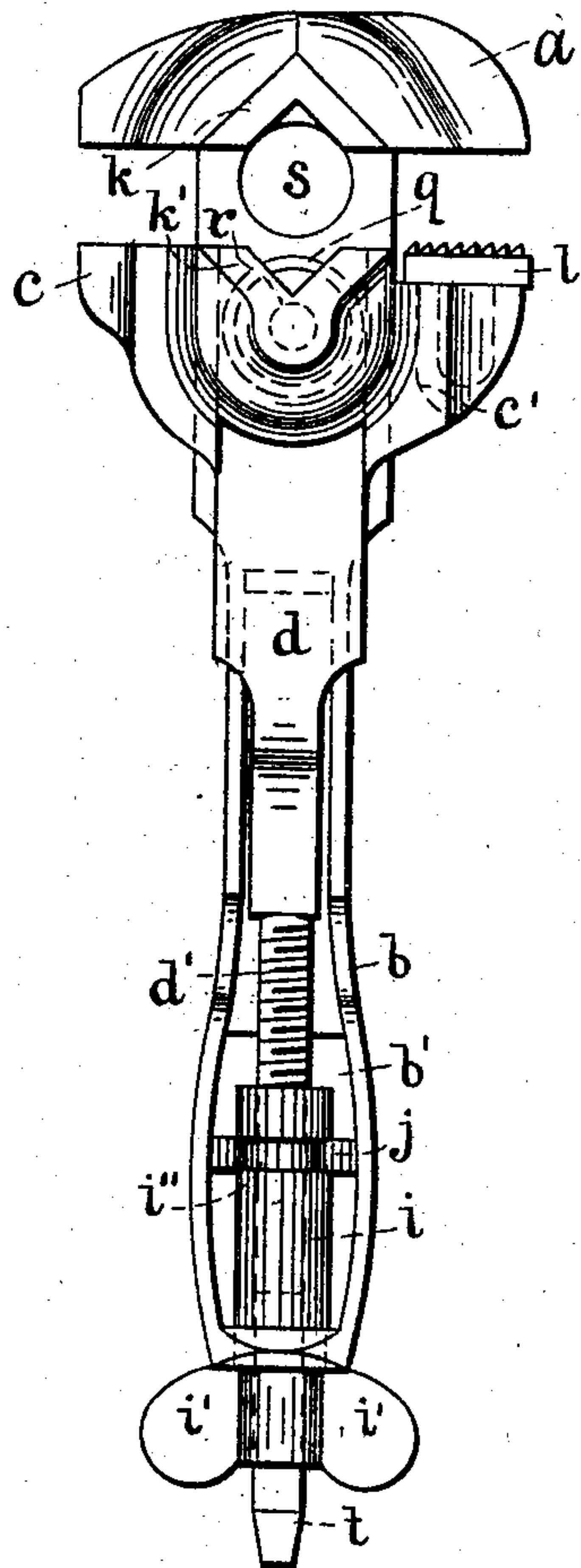


FIG. 1.

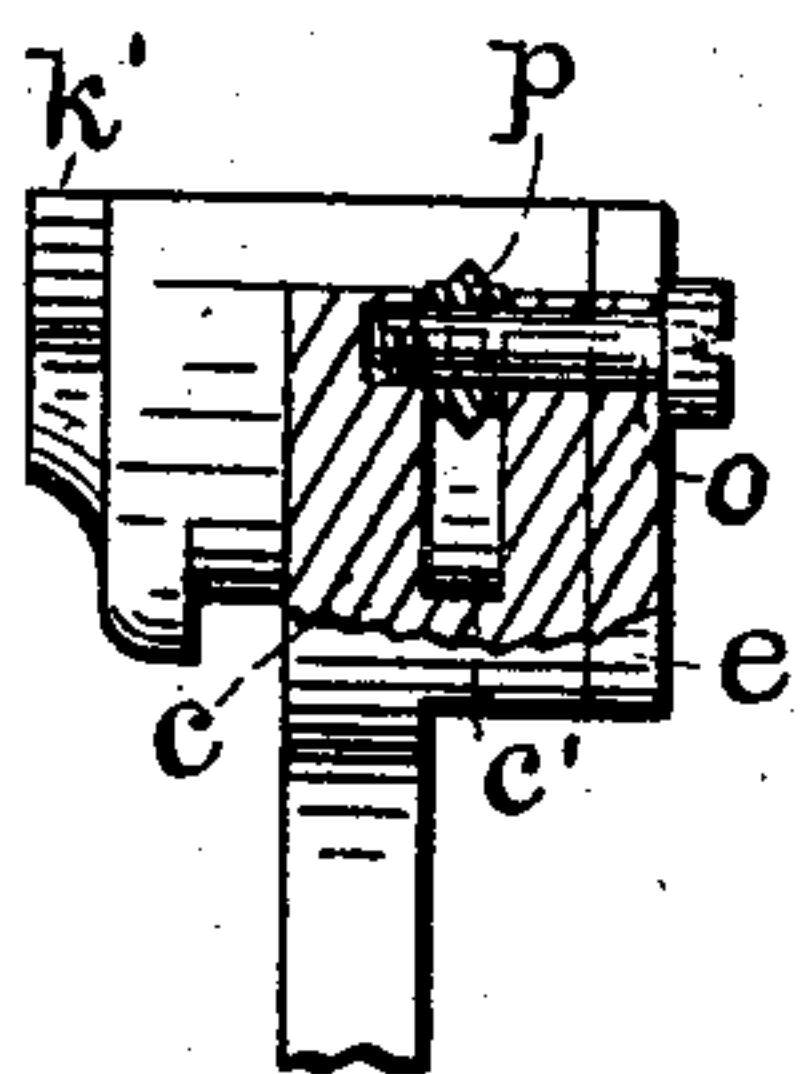


FIG. 5

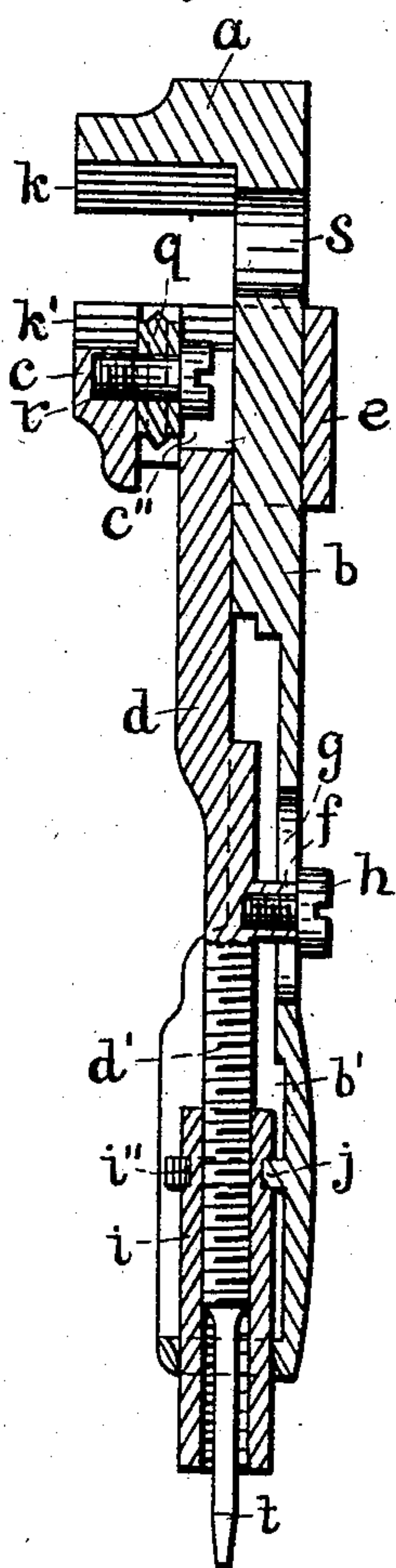
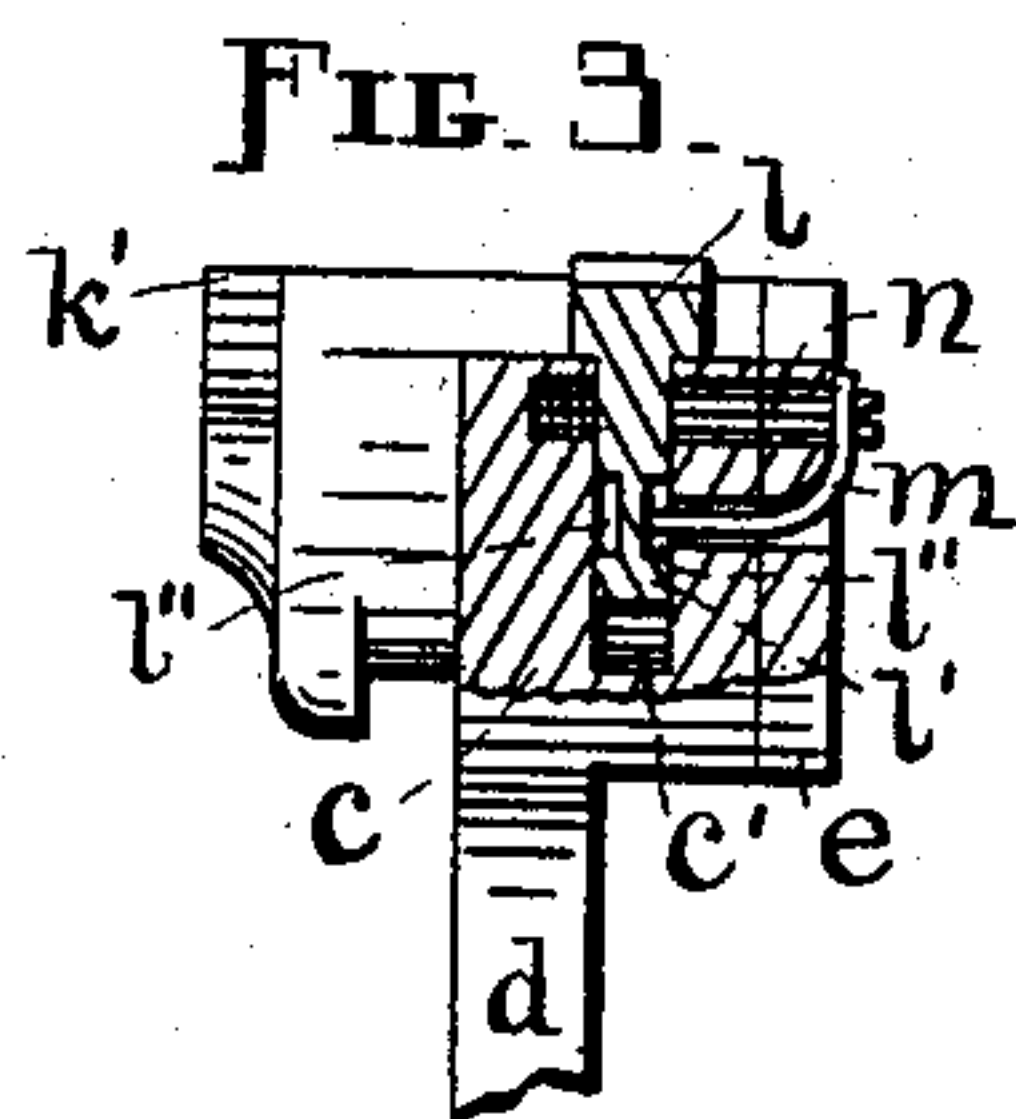


FIG. 4.

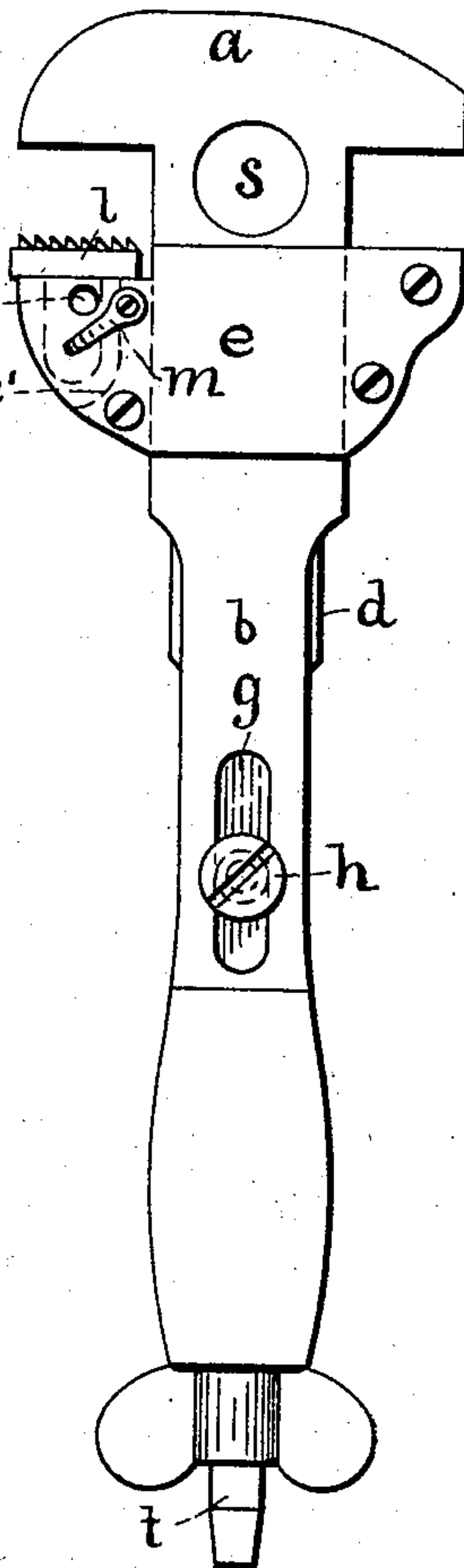


FIG. 2.

Witnesses  
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# UNITED STATES PATENT OFFICE.

THOMAS D. MILLEA, OF SPRINGFIELD, MASSACHUSETTS.

## COMBINATION-TOOL.

SPECIFICATION forming part of Letters Patent No. 720,168, dated February 10, 1903.

Application filed February 27, 1902. Serial No. 95,895. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS D. MILLEA, a citizen of the United States, residing at Springfield, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Combination-Tool, of which the following is a specification.

My invention relates to improvements in tools in which a movable jaw and a stationary jaw are employed; and the objects of my improvement are, first, to provide a strong, durable, and inexpensive wrench which is rigid and not liable to have its movable parts sprung or twisted out of alignment; second, to provide a wrench that can be easily and quickly taken apart and put together; third, to furnish a tool comprising one or more of the following-named implements: a monkey-wrench, a pipe-wrench, a head-end wrench or hand-vise, a pipe-cutter, and a screw-driver; fourth, to provide a reversible pipe-wrench grip and convenient means for holding or releasing the same; fifth, to afford convenient means for inserting or removing a pipe cutter or cutters, and, sixth, to provide a tool for carrying out the above-mentioned objects in a practical manner. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front view of my combination-tool; Fig. 2, a back view of the same; Fig. 3, a vertical cross-section through the pipe-wrench grip and that part of the movable jaw that carries it, showing the means by which said grip is held in place and how it may be reversed; Fig. 4, a central transverse cross-section of the tool; and Fig. 5, a section similar to Fig. 3, showing a small cutter in place of the pipe-wrench grip.

Similar letters refer to similar parts throughout the several views.

In Figs. 1, 2, and 4 of the drawings the jaws of the tool are shown separated or remote from each other; but it will be understood that they may be opened or closed like an ordinary wrench.

A fixed jaw *a* is mounted at the end of a shank *b*, the lower end of which latter constitutes the handle of the tool and is recessed at *b'*. The jaw *a* and shank *b* are preferably integral. A movable jaw *c* is mounted be-

low the jaw *a* on the shank *b* and has a shank *d* preferably integral with said movable jaw. The upper part of the movable shank *d* is adapted to slide on the raised front surface of the shank *b* with the jaw *c*, and the lower part of said shank *d* turns backward into the recess *b'*. A rounded part of the shank *d* is screw-threaded and constitutes what may be termed the "screw" *d'*. The projecting ends of the jaw *c* are thick enough to embrace the edges of the upper part of the shank *b*, upon which said jaw slides, and a plate *e*, extending across said shank, is secured to the back of said projecting ends by screws or other suitable means. The jaw *c* is attached to the shank *b* in the manner just described, but loosely, so that it can slide thereon. A post *f* extends from the back of the shank *d* above the threaded part or screw *d'* into a slot *g*, provided for its reception in the shank *b*, and a large-headed screw *h* is threaded to said post. The head of the screw *h* bears against the back of the shank *b*, and the two shanks are connected by this screw in such a manner that one can slide upon the other within the limits fixed by the ends of the slot *g*.

An internally-screw-threaded sleeve *i* is inserted through an opening in the lower end of the shank *b* to receive the shank-screw *d'*, said sleeve operating in the lower part of the recess *b'* and being provided with thumb and finger wings *i' i'* outside of said shank *b*, by means of which the sleeve is turned. The opening for the sleeve *i* in the end of the shank *b* must be large enough to permit the upper end of said sleeve to be projected forward sufficiently for the insertion of the screw-driver, presently to be described, and the shank-screw *d'* when the parts are assembled. It is necessary to provide some suitable means to prevent endwise movement of the sleeve *i* when the same is rotated, such as a collar or flange *j*, extending into the recess *b'* and engaging a groove *i''* in said sleeve. The flange *j* is open in front to allow the grooved part of the sleeve *i* to be laid into it. It will now be seen that when the sleeve *i* is turned in one direction the jaw *c* on its shank *d* will be forced toward the jaw *a*, and when said sleeve is turned in the other direction said jaw *c* will be drawn away from said jaw *a*, the



slot *g* being long enough to permit of these closing and opening movements.

The middle parts of the jaws *a* and *c* project forward and are cut away to provide the head-end wrench or hand-vise lips *k* and *k'*.

The upper edge of one end of the jaw *c* is lower than the upper edge of the rest of the jaw to provide for the reception of the serrated pipe-wrench grip *l*, the depending stem *l'* of which extends into a slot *c'* in said jaw adapted to receive it. The stem *l'* rests loosely in the slot *c'*, and the grip *l* can be reversed at will, which constitutes a valuable feature of my invention, since it is often desirable, not to say necessary, to reverse the grip. In order to prevent the grip *l* from becoming detached, I provide a catch *m*, the outside end of which is attached to the back of the plate *e*. The catch *m* is bent, so as to enter openings in the plate *e* and jaw *c* provided for its reception. The stem *l'* has a depression *l''* in each side, and the inner end of the catch *m* is designed to register with one of these depressions. The catch *m* is resilient, so as to permit of the withdrawal of its inner end from engagement with the stem *l'*, and when such withdrawal is made the grip *l* is free to be removed for any purpose. Depressions *l''* are provided in both sides of the stem *l'*, as stated, in order to allow the grip *l* to be turned about and held from either side. Each depression *l''* is made considerably larger than the engaging end of the catch *m*, so the latter will not hinder the rocking movement of the grip *l* when in use.

A hole *n* may be bored through the plate *e* into the slotted end of the jaw *c* to receive a screw or stud *o* when it is desired to use this part of the tool for a pipe-cutter. The front end of the hole *n* is screw-threaded, as is the registering part of the stud *o*. Before mounting the small cutter *p*, which is designed to operate in the slot *c'*, it is necessary to remove the grip *l*. Then the stud *o* is screwed into place with said cutter thereon. The cutter *p* is so mounted that it projects somewhat above the upper edges of the slot *c'*. This device is useful for operating upon pipes that are so located as not to be conveniently reached with the cutter *q*, described below.

In order to provide a stronger and more serviceable pipe-cutter than that described in the preceding paragraph, I recess the central part of the jaw *c*, as best shown at *c''* in Fig. 4, and introduce into this recess a cutter *q*, which is mounted on a screw or stud *r*, having its front end threaded into an opening in the solid part of said jaw. The cutter *q* extends into the head-end-wrench notch in the jaw *c*. A hole *s* is provided in the shank *b* below the head-end-wrench notch in the jaw *a*. When the cutter *q* is used, the pipe to be operated upon is inserted in the hole *s* and the jaw *c* moved toward the jaw *a* by turning the sleeve *i* until the cutter comes into contact with the pipe, which is then cut in the usual manner. To replace the cutter

*q* when worn out or broken, it is simply necessary to remove the plate *e* and the screw *h*, separate the jaw *c* and its shank from the shank *b*, and take out the stud *r*. After replacing the old cutter with a new one on the stud *r* the separated parts are reassembled.

By placing a cutter in the center of the tool in the manner shown and described greater power is obtained and there is less liability to break or disarrange the parts than when the cutter is placed at one side of the center, as shown in Fig. 5.

I prefer to prolong the shank *d* below the threaded part *d'* and form this prolongation into a screw-driver *t*. The screw-driver *t* reciprocates freely in the sleeve *i* and is projected some distance beyond the open end of the same when the jaws are separated or opened. The jaws serve as a handle for the screw-driver *t* in practice, and the latter constitutes a strong, serviceable, and valuable implement and an important part of my invention. Since the screw-driver is either integral with or rigidly attached to the shank *d*, it is a fixture so long as the sleeve *i* is not turned, and no amount of pressure on said screw-driver can overcome the friction between the screw *d'* and said sleeve to turn the latter.

The left-hand ends of the jaws *a* and *c* as they stand in Fig. 1, with the shanks and actuating mechanism, make up the monkey-wrench, and the right-hand ends of said jaws, with the grip *l*, shanks, &c., form the pipe-wrench. The head-end wrench or hand-vise consists of the notched lips *k* and *k'* on the jaws, with the shanks and actuating mechanism, as before. The same jaws, shanks, and actuating mechanism also enter into the complete construction of the pipe-cutters and the screw-driver, and the tool taken as a whole combines these various implements compactly and interdependently.

Minor changes may be made, particularly in regard to shape and size and the means by which the movable jaw and shank are held to the immovable shank and by which the movement is limited, without departing from the nature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A tool comprising an immovable slotted and recessed shank having a jaw, a movable shank mounted on said immovable shank and having a jaw below the first jaw, a plate back of the immovable shank, connecting the ends of the movable jaw, a screw connection between said shanks, a grooved sleeve engaging the movable shank, and a flange *j* in the immovable-shank recess to engage the sleeve-groove, for the purpose set forth.

2. A tool comprising an immovable shank having a jaw and a recess, a grooved and threaded sleeve in said recess, a flange *j* in the recess registering with the sleeve-groove, and a movable shank having a jaw below the first jaw and a screw engaging said sleeve,



whereby said movable shank is actuated when the sleeve is turned, substantially as shown and described.

3. A combination-tool comprising an im-  
 5 movable shank having a jaw and a recess, a  
 grooved and threaded sleeve in said recess, a  
 movable shank having a jaw below the first  
 jaw and a threaded part engaging said sleeve,  
 one end of the movable jaw being slotted, a  
 10 plate *e* adapted to hold said movable shank  
 and jaw to said immovable shank, a flange *j*  
 in the recess to engage the sleeve-groove and  
 prevent endwise movement of the sleeve when  
 turned, and a pipe-wrench grip provided with  
 15 a stem loosely depending into the slot in the  
 movable jaw, substantially as shown and de-  
 scribed.

4. A combination-tool comprising an im-  
 movable shank having a jaw, a movable shank  
 20 mounted on said immovable shank and hav-  
 ing a jaw slotted at one end, a grip provided  
 with a stem extending into the movable-jaw  
 slot, said stem having a depression or depres-  
 sions therein, and a resilient catch fastened  
 25 outside of the movable jaw and extending in-  
 ward to register with one of the stem depres-  
 sions.

5. A combination-tool comprising an im-  
 movable shank having a jaw and a recess, a  
 30 grooved threaded sleeve in said recess, a mov-  
 able shank having a jaw below the first jaw  
 and a threaded part engaging said sleeve, for-  
 wardly extending head-end or hand-vise  
 notched lips *k* and *k'* on said jaws, a plate *e*  
 35 adapted to hold said movable shank and jaw  
 to said immovable shank, and a flange *j* in

the recess to engage the sleeve-groove and  
 prevent endwise movement of the sleeve when  
 turned, substantially as shown and described.

6. A combination-tool comprising an im- 40  
 movable shank having a jaw and a recess,  
 said shank being provided with a pipe-hole,  
 a threaded sleeve in said recess, a movable  
 shank having a jaw with a recess therein,  
 mounted on said immovable shank, a part 45  
 of said movable shank being threaded to en-  
 gage said sleeve, a cutter in the jaw-recess,  
 a stud upon which said cutter is mounted,  
 rigidly secured to the movable jaw, means to  
 hold the movable shank to the immovable 50  
 shank, and means to prevent endwise move-  
 ment of the sleeve when turned.

7. A combination-tool comprising an im-  
 movable shank having a jaw and a recess, a  
 grooved and threaded sleeve in said recess, a 55  
 movable shank having a jaw below the first  
 jaw and a threaded part engaging said sleeve,  
 a screw-driver extending from said threaded  
 part into the sleeve, a plate *e* adapted to hold  
 said movable shank to said immovable shank, 60  
 and a flange *j* in the recess to engage the  
 sleeve-groove and prevent endwise movement  
 of the sleeve when turned, substantially as  
 shown and described.

In testimony whereof I have signed this 65  
 specification in the presence of two subscrib-  
 ing witnesses.

THOMAS D. MILLEA.

Witnesses:

M. J. CARROLL,  
 F. A. CUTTER.