(No Model.) 2 Sheets—Sheet 1.

A. SHEPARD.

RATCHET BRACE.

No. 309,887. Patented Dec. 30, 1884.

Fig. 1.

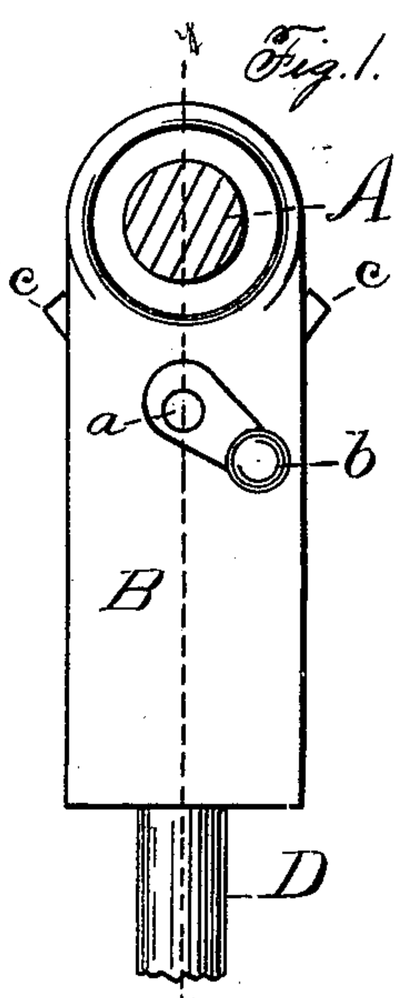


Fig. 2.

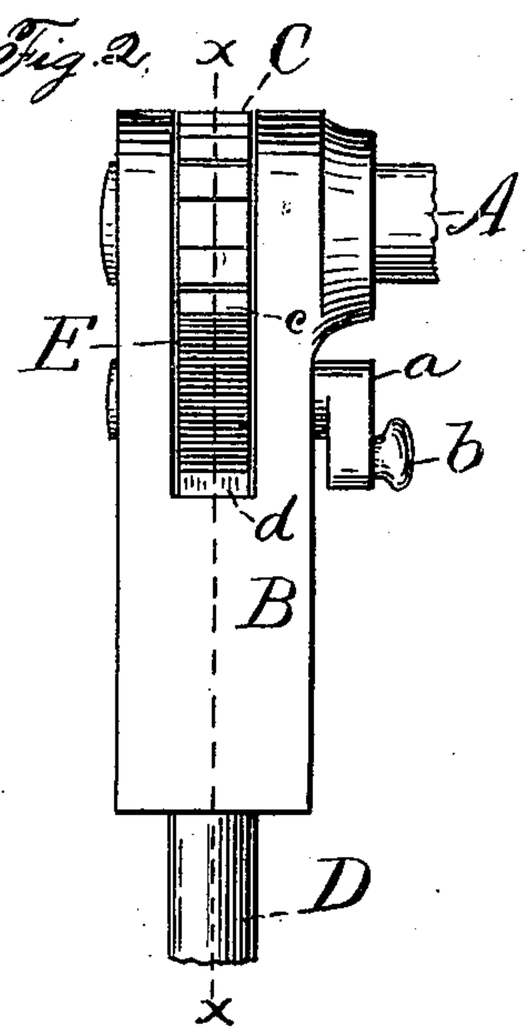


Fig. 3.

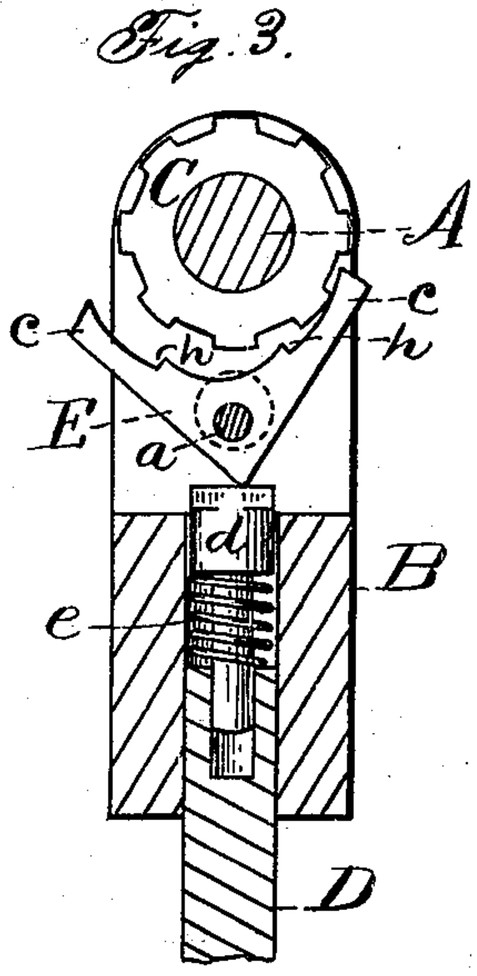


Fig. 4.

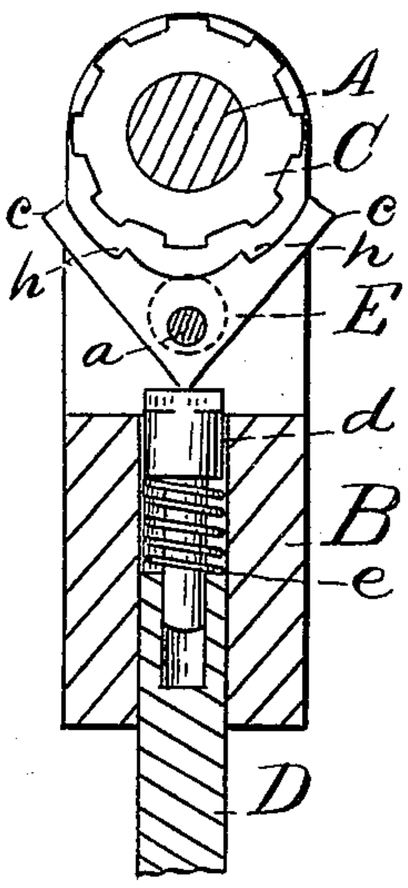


Fig. 5.

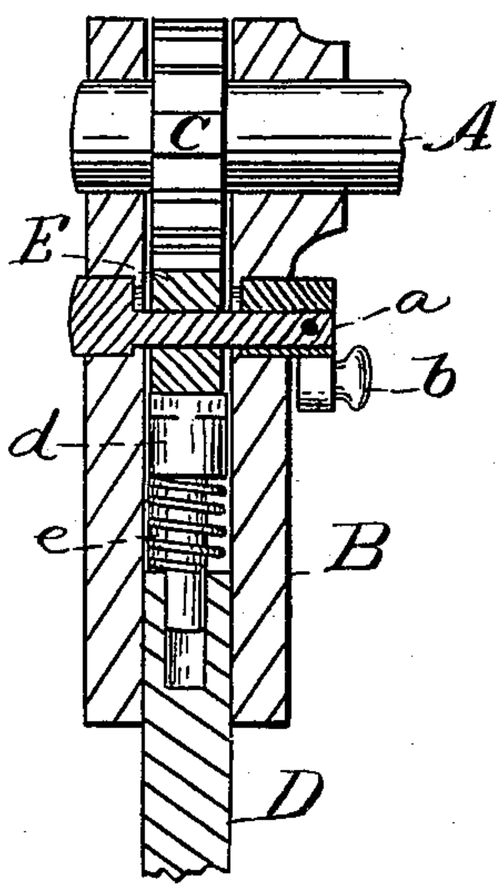
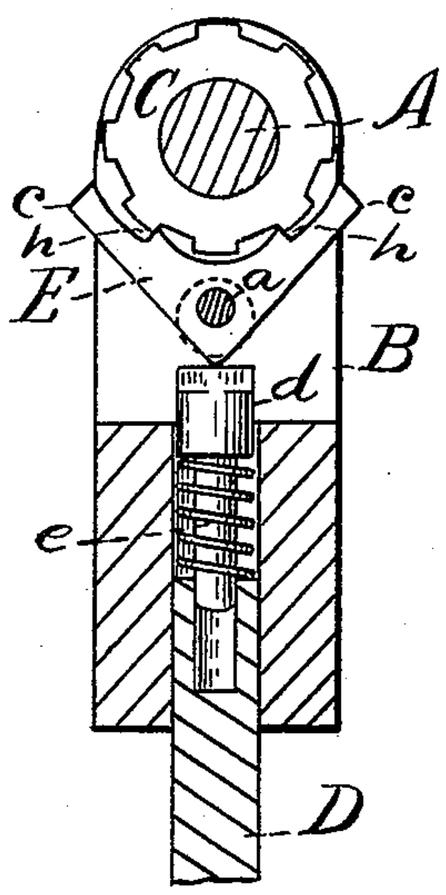


Fig. 6.



Witnesses.
John Edwards Jr.
Eddy N. Smith

Inventor.
Amos Shepard.
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Atty.

(No Model.)

2 Sheets—Sheet 2.

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RATCHET BRACE.

No. 309,887. Patented Dec. 30, 1884.

Fig. 7

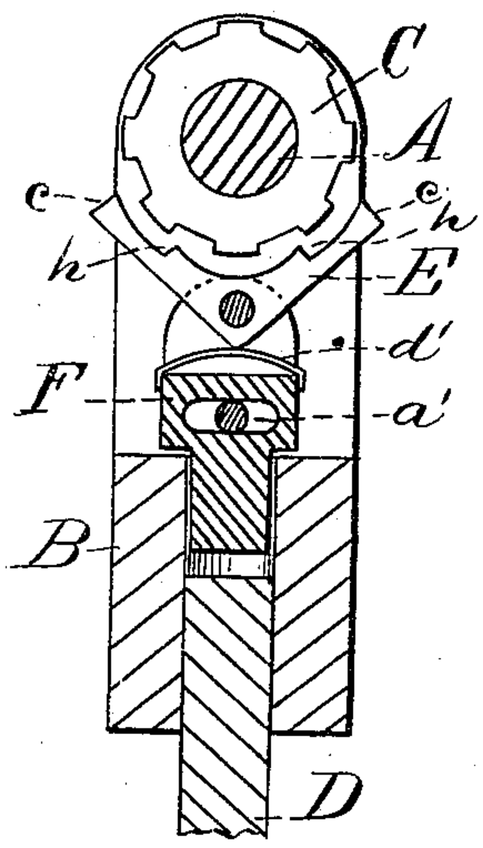


Fig. 8.

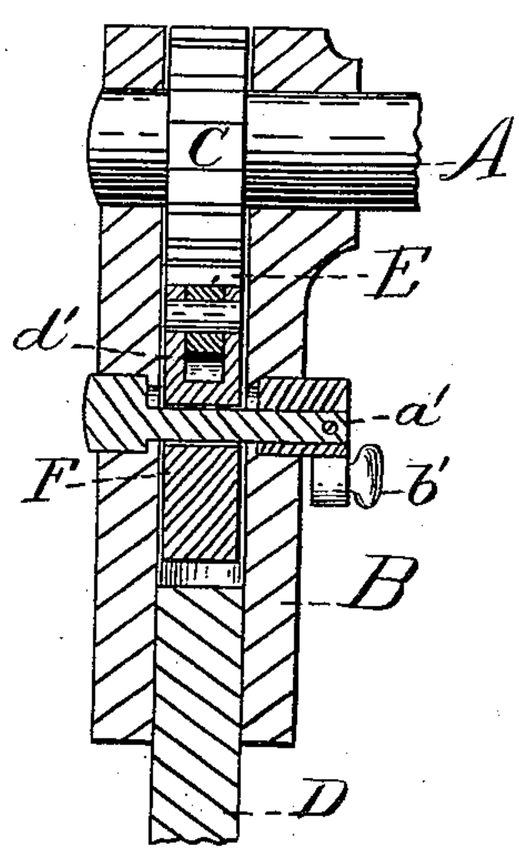


Fig. 9.

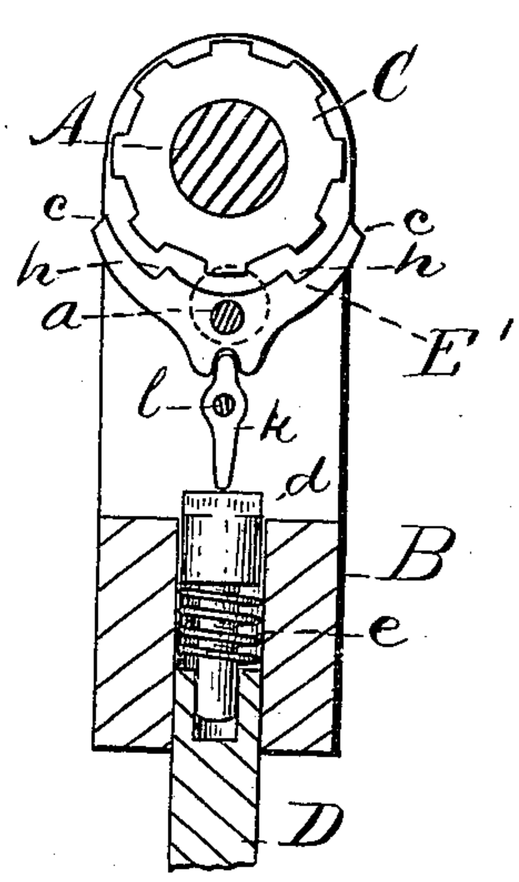


Fig. 10.

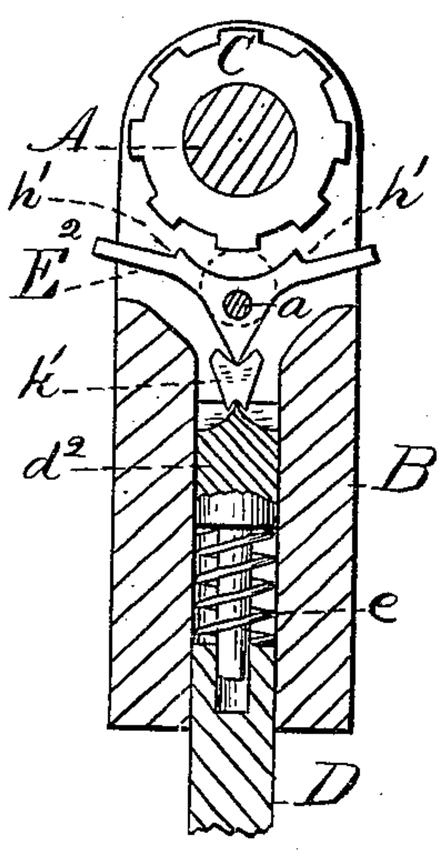
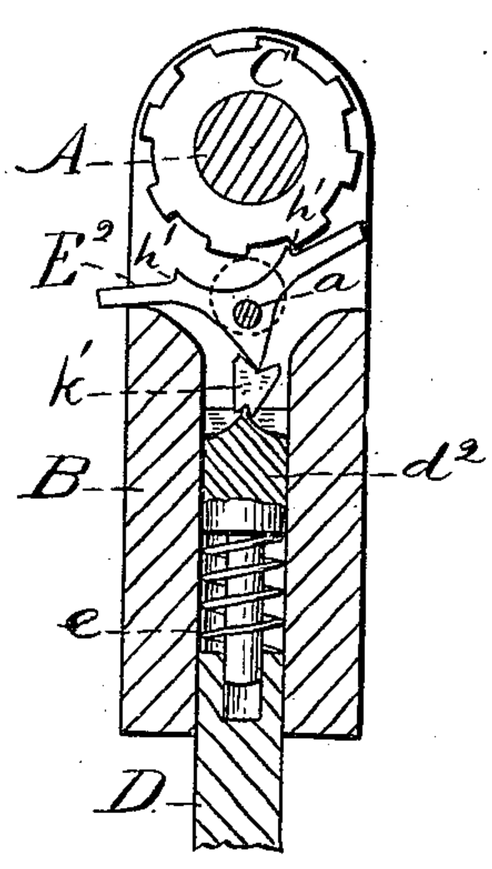


Fig. 11.



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UNITED STATES PATENT OFFICE.

AMOS SHEPARD, OF PLANTSVILLE, ASSIGNOR TO THE PECK, STOW & WILCOX COMPANY, OF SOUTHINGTON, CONNECTICUT.

RATCHET-BRACE.

SPECIFICATION forming part of Letters Patent No. 309,887, dated December 30, 1884.

Application filed December 22, 1883. (No model.)

To all whom it may concern:

Be it known that I, AMOS SHEPARD, a citizen of the United States, residing at Plantsville, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Ratchet-Braces, of which the following is a specification.

My invention relates to an improvement in ratchet-braces and analogous tools, and the objects of my improvement are to simplify the construction of the parts, to bring them into a compact and convenient form for operation, to make the tool efficient in operation, and to very firmly lock the ratchet-wheel against rotation in either direction when desired. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a reversed plan view of my ratchet mechanism, with its driving-shaft represented in transverse section. Fig. 2 is a side elevation thereof. Fig. 3 is a horizontal section thereof, partly in elevation, on line *x x* of Fig. 2, the same being represented with one arm of the pawl as engaged with the ratchet-wheel. Fig. 4 is a like view of the same represented with the ratchet-wheel free. Fig. 5 is a vertical section of the same, partly in elevation, on line *y y* of Fig. 1. Fig. 6 is a horizontal section like Figs. 3 and 4, but represented with the ratchet-wheel locked against rotation. Fig. 7 is a like view of a modified form of my ratchet mechanism. Fig. 8 is a vertical section thereof, partly in elevation. Fig. 9 is another horizontal section, similar to Figs. 3, 4, and 6, but showing an additional element; and Figs. 10 and 11 are like sections, showing still other changes.

A designates the driving-shaft, represented as broken off, and to which any suitable tool-holder, wrench-socket, or other mechanism designed to be rotated may be attached. This shaft is mounted in the head or frame B, and rigidly connected to said shaft is the ratchet-wheel C. Projecting from the opposite end of the head is the handle D, represented as broken off, but which is designed to be extended in the form of the bow of a brace or a simple lever, or other convenient form, as may be desired.

Within the head or frame B is the pawl E, which is pivoted in the frame by means of the shaft *a*, mounted eccentrically within the frame B, and provided with an operating crank or handle, *b*, by means of which it may be rotated. This pawl is provided with two arms, *c c*, for engaging one at a time with the teeth of the ratchet-wheel C, as one of them is represented in Fig. 3.

Back of the pawl E, and within the head B, is a spring-actuated slide, *d*, which is so acted upon by the spring *e* as to continually press against the heel of the pawl E, as shown. When the pawl is set so that its heel is in alignment with the shafts A *a*, as shown in Fig. 4, both of the engaging-arms *c c* will be held out from engagement with the teeth of the ratchet-wheel. By pressing either of the arms *c* toward the ratchet-wheel the pawl may be turned on its shaft so as to throw the arm thus pressed upon into engagement, and also throw the heel of the pawl a little to one side of its axis, as shown in Fig. 3, in which position the spring *e*, acting through the slide *d*, will continually press the engaging-arm against the ratchet-wheel, and cause it to act in the ordinary manner of a spring-pressed pawl-and-ratchet wheel for driving the shaft A in one direction. By pressing upon the opposite arm *c* of the pawl it can be made to act in a like manner for driving the shaft A in the other direction.

In order to lock the ratchet-wheel rigidly against movement in either direction, I provide the pawl E with two locking-faces, *h h*, and I pivot the pawl upon the eccentric shaft *a*, so as to give the pawl a movement bodily upon its axis to and from the ratchet-wheel.

Before locking the ratchet, I swing the pawl into the position represented in Fig. 4. Then by turning the handle *b*, I force the pawl against the ratchet-wheel, thereby bringing the engaging-faces *h h* firmly into engagement with two teeth of said ratchet-wheel, as shown in Fig. 6, thereby rigidly locking the ratchet-wheel against rotation in either direction.

Instead of the slide *d*, actuated by a spiral spring, *e*, a flat spring, which bears directly upon the heel of the pawl, may be used, substantially as shown in Fig. 7, in which figure said spring is designated by the letter *d'*.

In the foregoing construction I have de-

scribed the pawl as pivoted upon the eccentric shaft for moving it to and from the ratchet-wheel; but other suitable mechanism may be employed for that purpose, if desired—for instance, the means illustrated in Figs. 7 and 8, in which I pivot the pawl to the end of a sliding frame, F, and I provide said frame with a transverse slot, as shown in Fig. 7, and passing through said slot is an eccentric shaft, a', and its handle b', like the shaft and handle $a\ b$, hereinbefore described, but used for the purpose of moving the sliding frame which carries the pawl to and from the ratchet-wheel. In this modification the pawl and its engaging arms and faces have the same action in connection with the ratchet-wheel as in the construction first described.

The construction represented in Fig. 9 is substantially like the construction first described, except that the heel of the pawl E′ does not rest directly upon the slide d, but has an intermediate vibratory dog, k, pivoted on the pin l, one end of which dog rests within a notch in the heel of the pawl E′ and the other end of which rests upon the slide d. This will cause the spring to act upon the pawl substantially the same as hereinbefore described, except that the end of the dog k will be thrown farther to one side than is the heel of the pawl, when one of the arms c engages the ratchet-wheel, thereby giving a longer leverage for the spring to act upon and consequently increasing the force of the pawl against the ratchet-wheel.

In Figs. 10 and 11 I have shown an intermediate vibratory dog, k', which is in the form of a toggle instead of being pivoted on a fixed pin, the heel of the pawl E^2 and end of the spring-pressed slide d^2 being thinned sufficiently to act in connection with the dog k' having notches at its ends, as shown.

In Fig. 10 the pawl E^2 is held in its neutral position, and in Fig. 11 it is turned to one side, so as to engage the teeth of the ratchet-wheel C. A comparison of said figures will clearly show the operation of the dog k' under pressure from the spring e. This pawl E^2 differs from that shown in the preceding figures in that it has but two faces, $h'\ h'$, for acting upon the wheel, the driving-faces and holding-faces being formed together. The extreme outer ends of the pawl-arms are only for convenience in swinging the pawl on its pivot into different positions. The pawl has both of its faces $h'\ h'$ simultaneously held into engagement with the ratchet-wheel to lock it in the manner herein first described.

I am aware that prior patents show ratchet-wrenches containing a pawl having two rigid arms for acting separately upon the teeth upon the ratchet-wheel, and I hereby disclaim the same.

I claim as my invention—

1. The combination of the ratchet-wheel, the oscillating pawl, and the mechanism for moving the pawl bodily toward or from the ratchet-wheel in a direct line, substantially as described, and for the purpose specified.

2. The combination of the ratchet-wheel, the pawl having engaging-arms $c\ c$ and separate holding-faces $h\ h$, and the mechanism for bringing said holding-faces $h\ h$ into and out of engagement with the teeth of the ratchet-wheel, substantially as described, and for the purpose specified.

3. The combination of the ratchet-wheel, the pawl, the vibratory dog for acting upon the heel of the pawl, and the spring for actuating said dog, substantially as described, and for the purpose specified.

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Witnesses:
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EDDY N. SMITH.