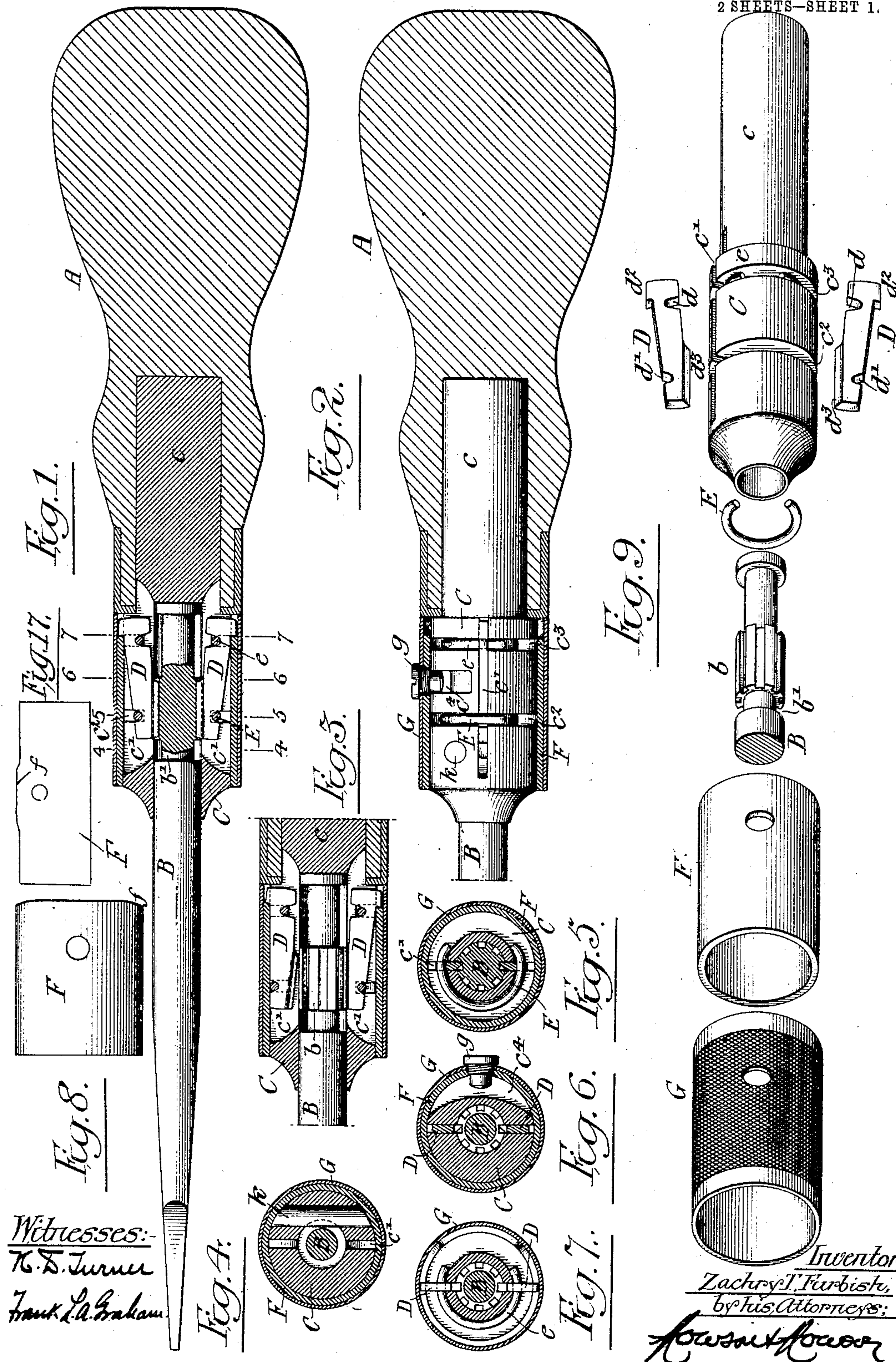


Z. T. FURBISH.
RATCHET TOOL.

APPLICATION FILED MAR. 27, 1903.

2 SHEETS—SHEET 1.



Witnesses:
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Inventor:
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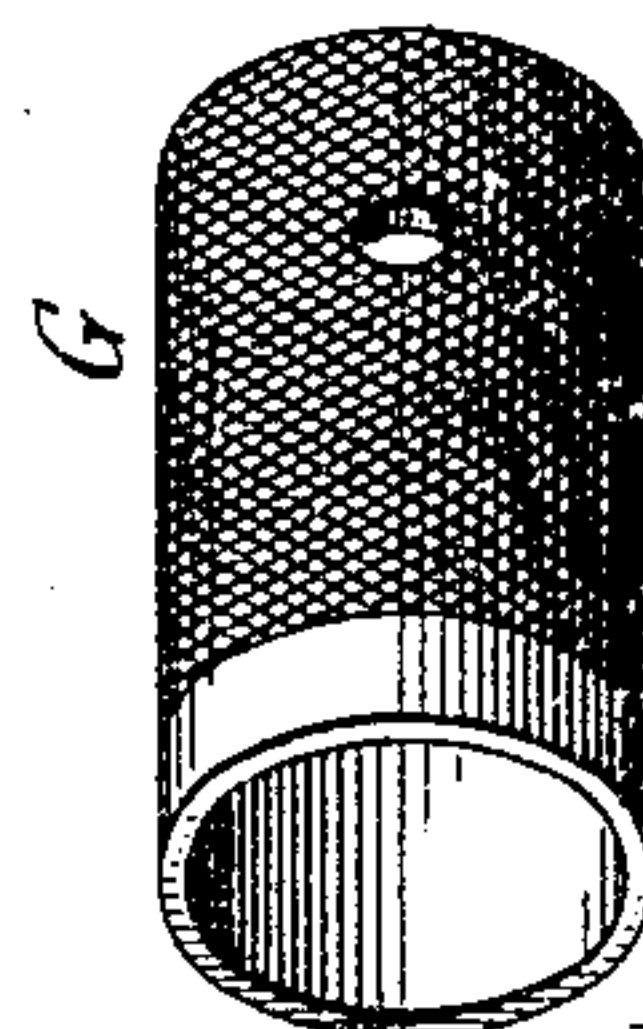
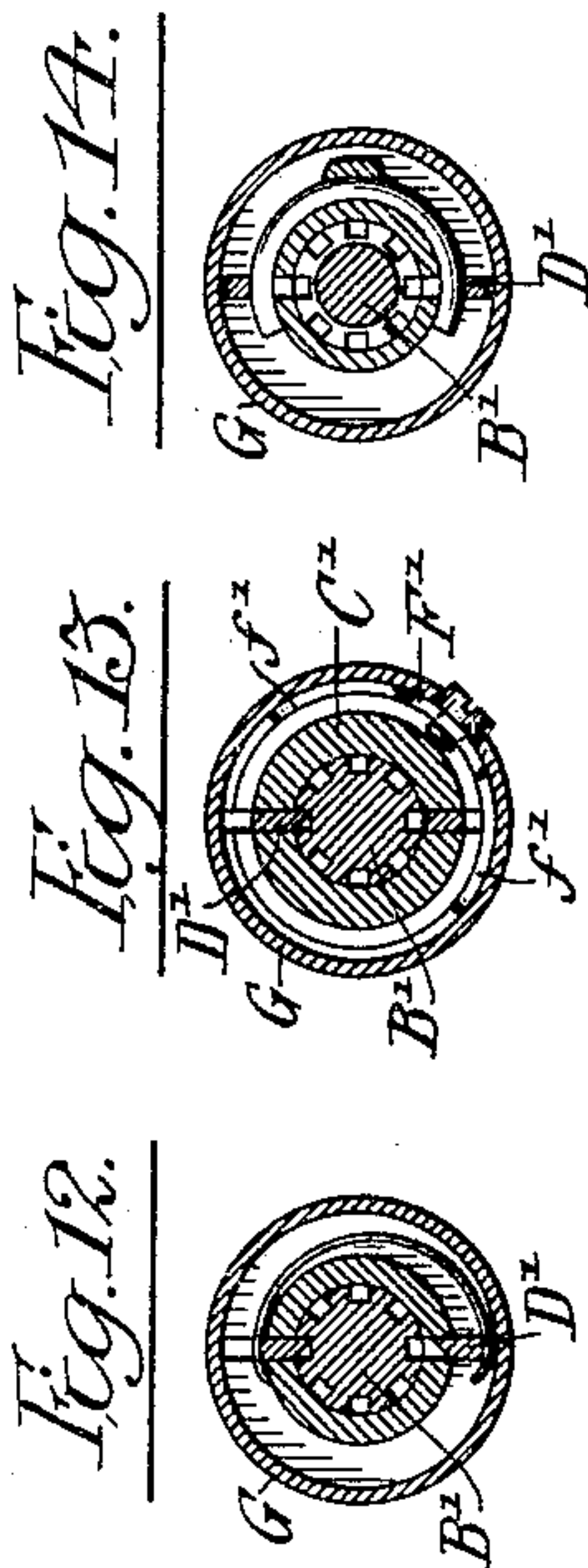
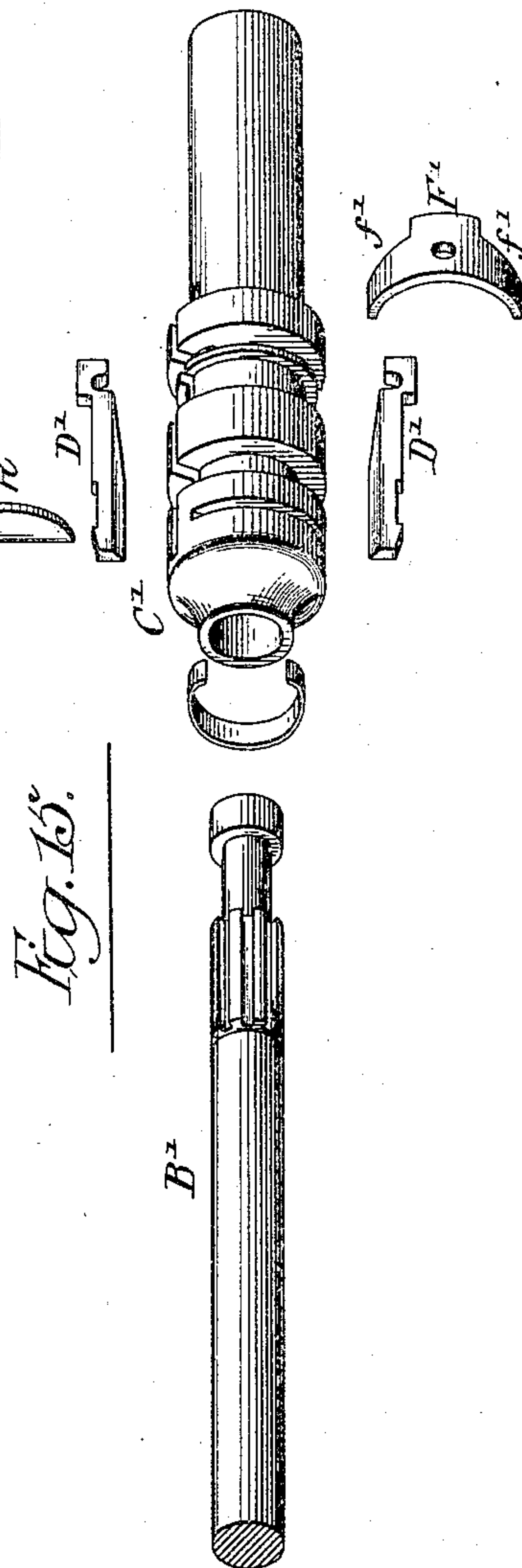
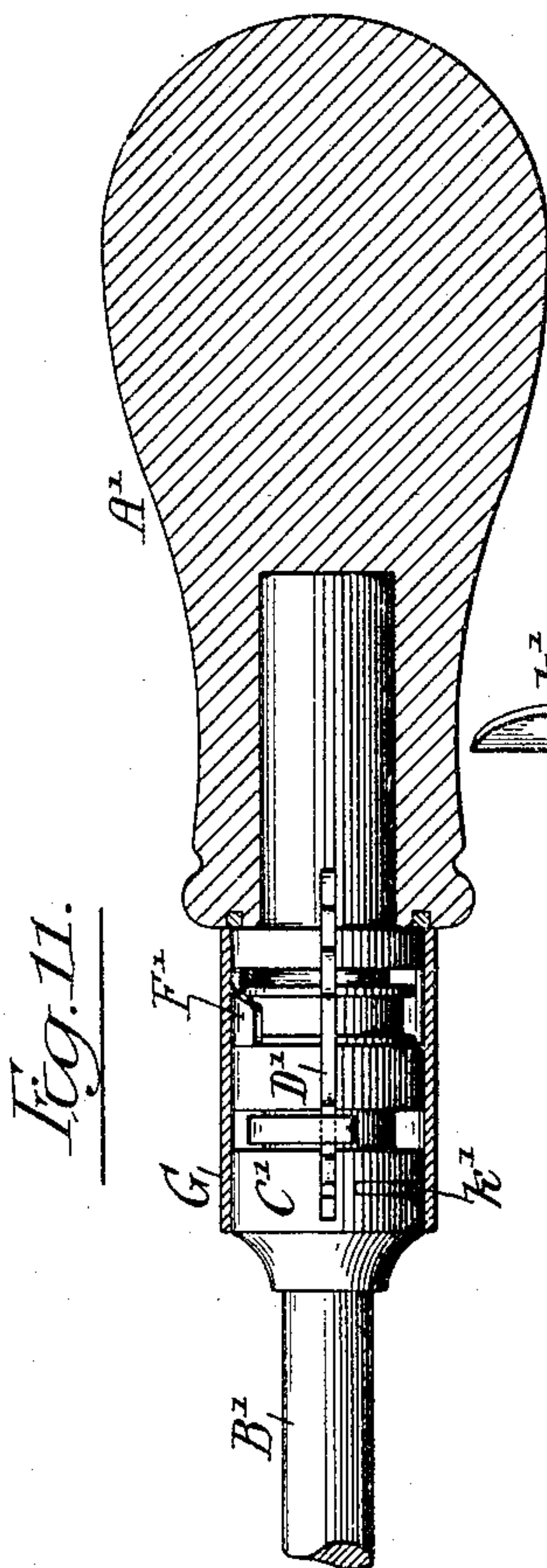
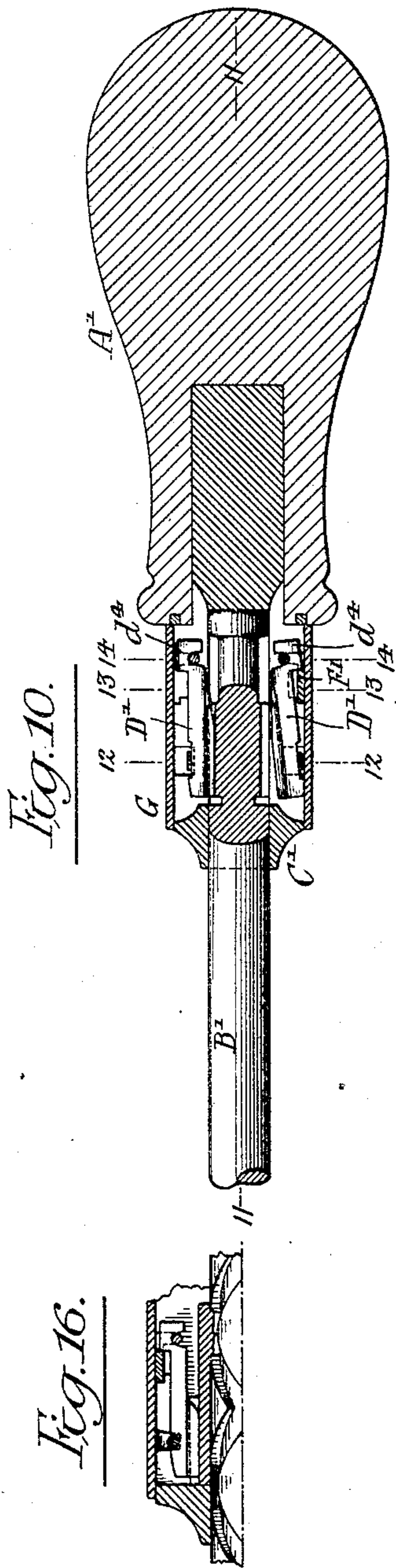
No. 791,895.

PATENTED JUNE 6, 1905.

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RATCHET TOOL.

APPLICATION FILED MAR. 27, 1903.

2 SHEETS—SHEET 2.



Witnesses:-

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UNITED STATES PATENT OFFICE.

ZACHRY T. FURBISH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
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RATCHET-TOOL.

SPECIFICATION forming part of Letters Patent No. 791,895, dated June 6, 1905.

Application filed March 27, 1903. Serial No. 149,840.

To all whom it may concern:

Be it known that I, ZACHRY T. FURBISH, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Ratchet-Tools, of which the following is a specification.

The object of my invention is to construct a ratchet-tool in which pivoted pawls are used in a simple and economical manner and to so arrange the mechanism that the pawls can be readily shifted into and out of engagement with the ratchet-teeth. This object I attain in the following manner, reference being had to the accompanying drawings, in which—

15 Figure 1 is a longitudinal sectional view of a screw-driver, illustrating my improvement. Fig. 2 is a sectional plan view of Fig. 1, the casing and handle being in section. Fig. 3 is a view similar to Fig. 1, showing one of the pawls out and the other in engagement with the ratchet-wheel. Fig. 4 is a section on the line 4 4, Fig. 1. Fig. 5 is a section on the line 5 5, Fig. 1. Fig. 6 is a section on the line 6 6, Fig. 1. Fig. 7 is a section on the line 7 7, Fig. 1. Fig. 8 is a detached view of the cam-sleeve. Fig. 9 is a view showing the parts of the ratchet screw-driver detached. Fig. 10 is a longitudinal sectional view of a modification. Fig. 11 is a section on the line 11 11, Fig. 10. Fig. 12 is a transverse section on the line 12 12, Fig. 10. Fig. 13 is a transverse section on the line 13 13, Fig. 10. Fig. 14 is a transverse section on the line 14 14, Fig. 10. Fig. 15 is a perspective view of the parts detached. Fig. 16 is a view illustrating my invention applied to a tool having a ratchet-wheel traveling on a spirally-grooved spindle, and Fig. 17 is a diagram showing a development of the cam-sleeve illustrated in Fig. 8.

40 I have shown my invention in connection with a ratchet screw-driver; but it will be understood that it can be applied to other tools as well.

In a pending application, Serial No. 149,839, filed by me I have described and claimed another form of ratchet-tool which operates upon

the same broad principle as that involved in the present invention.

C is the body carrying the ratchet mechanism. This body has a shank *c*, which enters 50 the handle A, which may be of any shape desired and can be secured to the body in any suitable manner. In the body is a central opening in which rests the inner end of the spindle B. On the inner end of the spindle 55 are the ratchet-teeth *b*, and in the present instance the end of the spindle abuts against the flat base of the opening. Radiating from this central opening are slots *c'*, in which the pawls D D are mounted. In the body portion are 60 two annular grooves *c² c³*, and mounted in one groove is the segmental pivot *e* for the pawls D and in the other groove is the segmental spring E. The pivot *e* is of such length as to extend across both slots *c'* in the body, as 65 shown in Fig. 7, and the spring E extends over both pawls, as in Fig. 5. The segmental pivot *e* may be loose in the slot *c³* or may be secured therein by solder or other means of fastening. Each pawl is grooved at *d* to 70 receive the pivot *e* and is also grooved at *d'* to receive the segmental spring E. When the pawls are in position on their pivots and the spring in place, the longitudinal movement of the pawls is prevented. 75

d² is a heel projecting from the rear end of each pawl, and this heel forms, in fact, the short arm of a lever, the long arm carrying the beveled portion *d³*, which engages the ratchet-teeth on the spindle. 80

Mounted on the body portion is a sleeve F, and the inner end of this sleeve is in the form of a cam *f*. (Clearly shown in Fig. 8.) This sleeve is secured in the present instance to the casing G by means of a screw *g*, the end 85 of which rests in a recess *c⁴*, Fig. 6, formed in the body C.

The spindle in the present instance is grooved at *b'*, and extending through a hole in the body portion is a pin *h*, which also ex- 90 tends into the groove *b'* and confines the spindle to the body, so that while the spindle

is free to rotate it cannot move longitudinally. The pin does not extend through the casing, so that it does not limit the free movement of the casing.

5 When the parts are in the position shown in Fig. 1, both pawls are in engagement with the ratchet-teeth, and the spindle is therefore locked to the handle. When it is desired to throw the upper pawl out of engagement, as in Fig. 3, the sleeve F is turned so
10 that the end thereof which bears upon the heel d^2 of the pawl will act upon the heel to raise the upper pawl out of engagement with the teeth of the spindle. Then the lower pawl
15 acts as a ratchet, so that the spindle will move with the handle in one direction, but allow the handle to move freely in the opposite direction. By again shifting the sleeve its cam acts upon the heel of the lower pawl, forcing
20 it out and allowing the spring to force the upper pawl into engagement when the reverse action takes place.

Referring to Figs. 10 to 15, inclusive, which illustrate a modification of my invention, the
25 pawls D' are mounted in slots in a body C', carried by a handle A' and having a spindle B' toothed to form ratchet-teeth with which the pawls engage. The heels d^4 of the pawl D' project at right angles from the pawl in
30 advance of the pivot, and a segmental cam F' travels in a groove in the body portion and has two beveled arms f' , which act upon the heels of the pawls to disengage them from the ratchet-teeth on the spindle. The spindle
35 in this instance is held to the body by a segmental plate k' in place of the pin k .

In Fig. 16 I have shown my invention applied to what is known as a "spiral" tool—that is, one in which a spiral groove is cut in
40 the spindle and on the spindle is a ratchet or toothed wheel having a tongue entering the spiral groove. The pawl is so shaped that when it is in engagement with the teeth of the wheel it locks the wheel to the body, so that
45 when the body moves longitudinally the spindle will be turned in one direction or the other.

I claim as my invention—

1. The combination in a ratchet-tool of a
50 body portion, a spindle, a ratchet having teeth which extend substantially parallel to the line of the spindle, a pawl pivoted to the body portion, and a revoluble piece having a cam-shaped portion placed to act upon said pawl,
55 the pivot of the pawl being substantially at right angles to the line of the spindle, substantially as described.

2. The combination in a ratchet-tool of a
60 body portion, a spindle including a part having teeth extending in substantially the line of the spindle having a pawl pivotally mounted in a slot in the body portion and extending in the line of the spindle, said pawl having a heel

projecting at an angle to its length, a casing, and a cam placed to act upon the heel of the
65 pawl, said pawl being placed in the slot so as to be confined between a tooth and the wall of said slot, substantially as described.

3. The combination in a ratchet-tool of a
body portion, a spindle, a ratchet, two pawls
70 pivoted to the body portion in such manner as to extend in substantially the line of the tool, means for forcing said pawls into engagement with the ratchet, each pawl having a heel projecting at an angle from one end thereof and
75 a cam revoluble on the body portion having a surface substantially at right angles to the spindle, said cam being free to act upon the heel of either pawl to disengage it from the ratchet and both of said pawls being placed so
80 as to be confined when in action between a tooth of the ratchet and a part of the body portion, substantially as described.

4. The combination of a body portion having a central opening and radiating slots, annular grooves in the body portion, a spindle
85 mounted in the central opening, ratchet-teeth on the spindle, a segmental pivot-bar mounted in one of the annular grooves, a segmental spring mounted in the other annular groove,
90 pawls mounted on the pivot-bar, the spring acting upon the said pawls to force them into engagement with the ratchet-teeth, each pawl having a heel, and a cam-sleeve mounted on the body portion and arranged to engage the
95 heels to throw either one of the pawls out of engagement with the ratchet-teeth, substantially as described.

5. The combination of a body portion, a spindle mounted therein, ratchet-teeth on the spindle,
100 radial slots in the body portion, two annular grooves in the body portion, a segmental pivot mounted in one groove, two pawls, each pawl having a notch for the reception of the pivot and having a notch at the outer end,
105 a segmental spring mounted in the other groove in the body portion and resting in the notch of each pawl, each pawl having a heel projecting from the pivot end, a cam-sleeve mounted on the body portion and acting
110 against the heels of the pawls, so as to throw either one of the pawls out of engagement with the ratchet-teeth and the spindle, substantially as described.

6. The combination of a body portion, a spindle mounted therein, ratchet-teeth on the spindle,
115 radial slots in the body portion, two annular grooves in the body portion, a segmental pivot mounted in one groove, two pawls, each pawl having a notch for the reception of the pivot and having a notch at the outer end,
120 a segmental spring mounted in the other groove in the body portion and resting in the notch of each pawl, each pawl having a heel, a cam-sleeve mounted on the body portion and
125 acting against the heels of the pawls, so as to

throw either one of the pawls out of engagement with the ratchet-teeth and the spindle, with a casing covering the sleeve, a screw confining the casing to the sleeve, said screw entering a segmental slot in the body portion, substantially as described.

In testimony whereof I have signed my name

to this specification in the presence of two subscribing witnesses.

ZACHRY T. FURBISH.

Witnesses:

WILL. A. BARR,
JOS. H. KLEIN.