

Z. T. FURBISH.
RATCHET MECHANISM.
(Application filed June 25, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

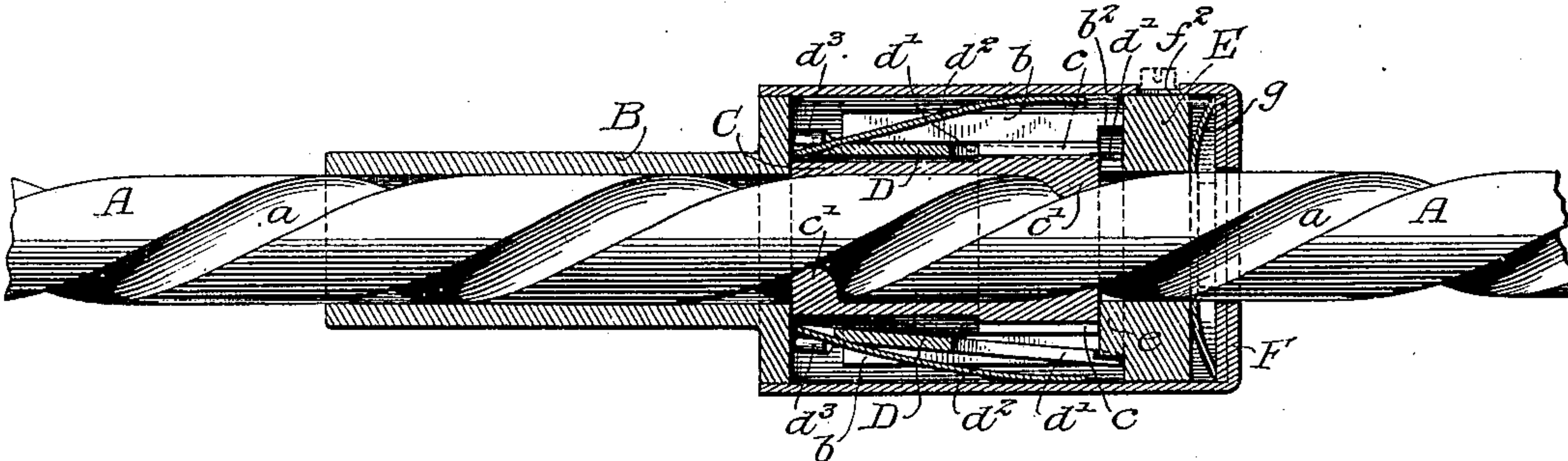


Fig. 2.

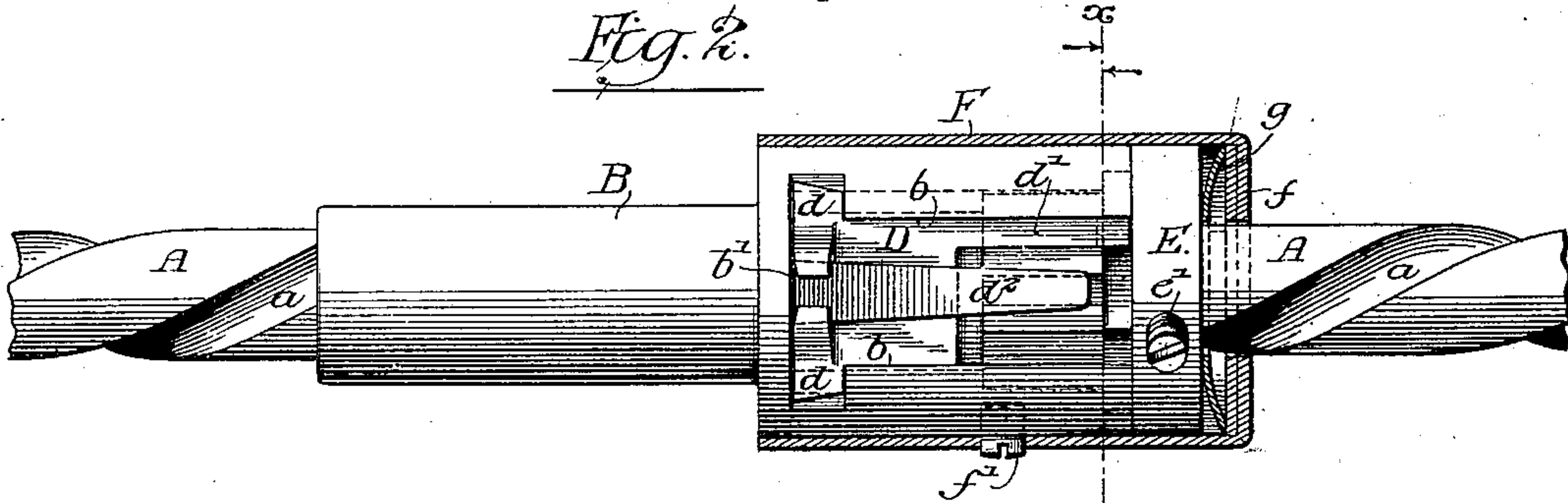


Fig. 3.

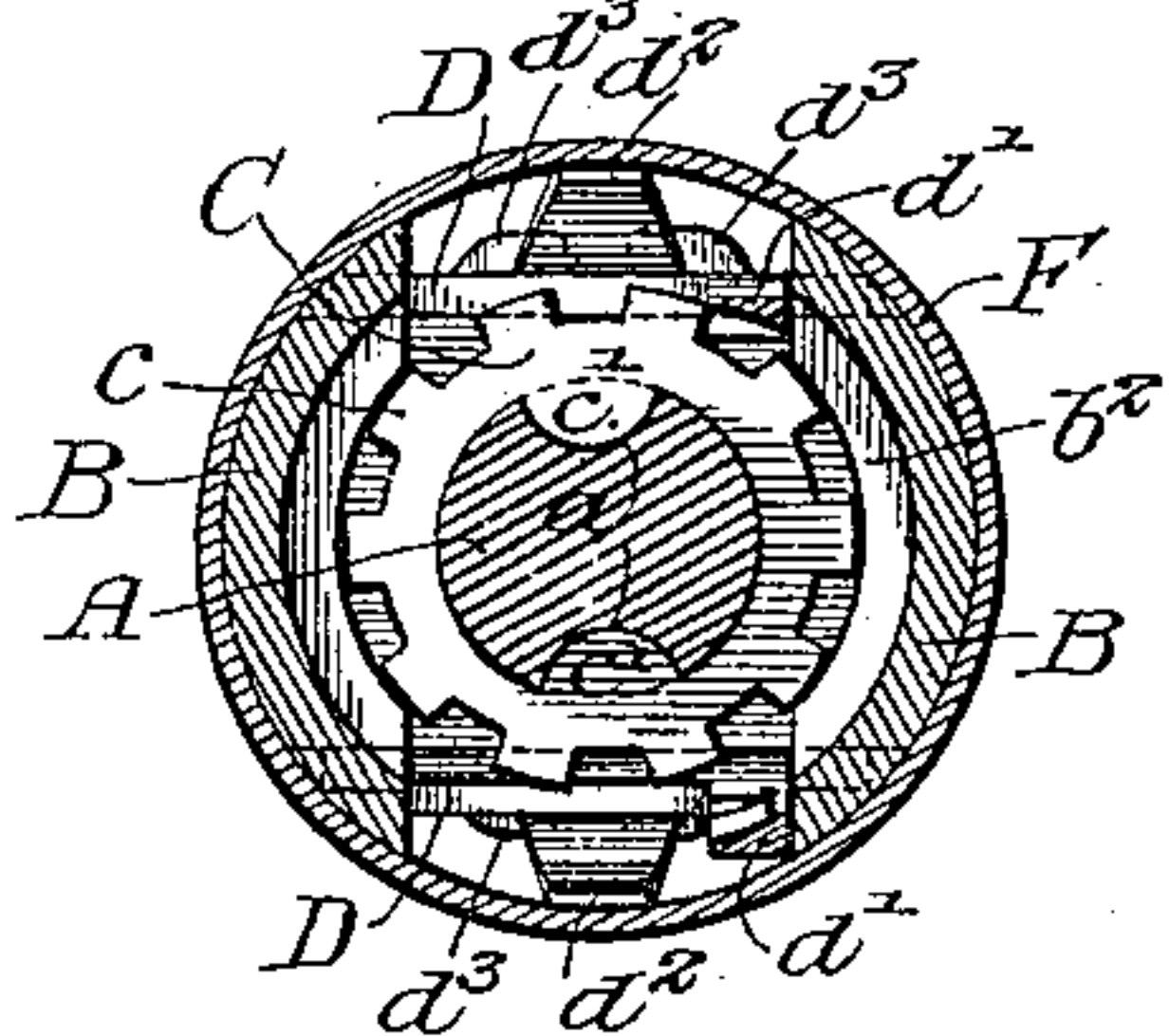


Fig. 4.

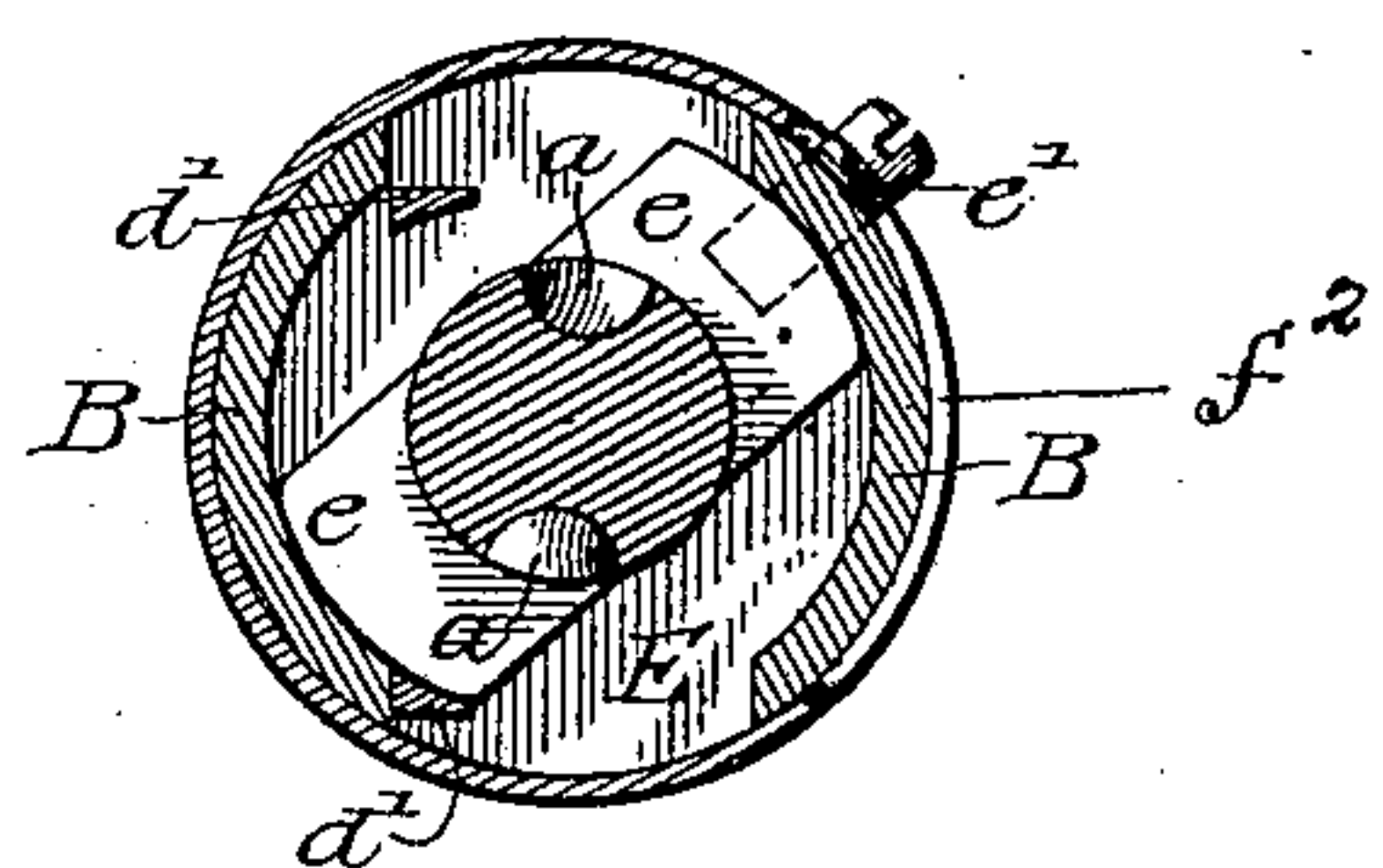
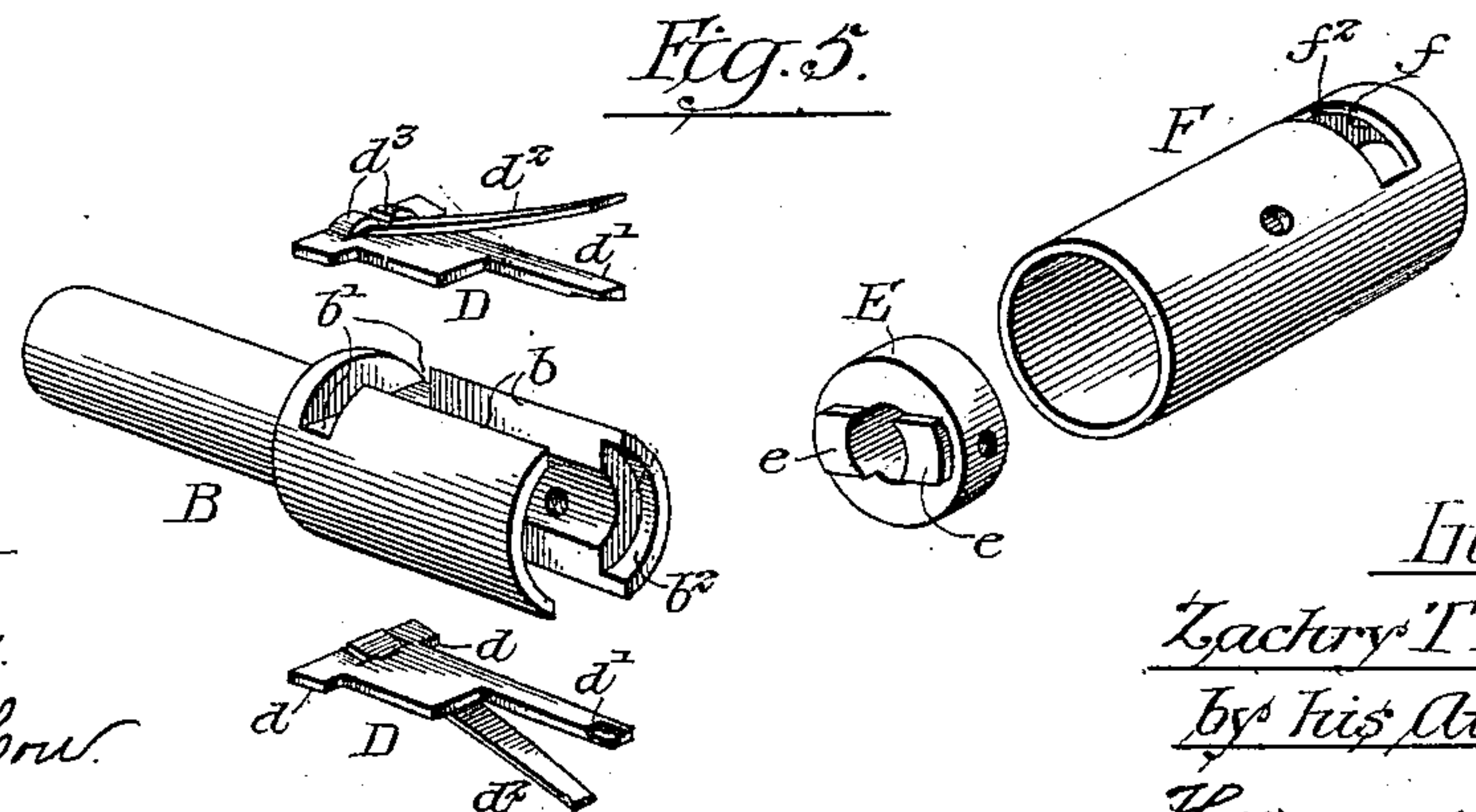


Fig. 5.



Witnesses:-

Louis M. F. Whitehead.
Charles De Cour.

Inventor:

Zachary T. Furbish
by his Attorneys.
Howson & Howson

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2 Sheets—Sheet 2.

Fig. 6.

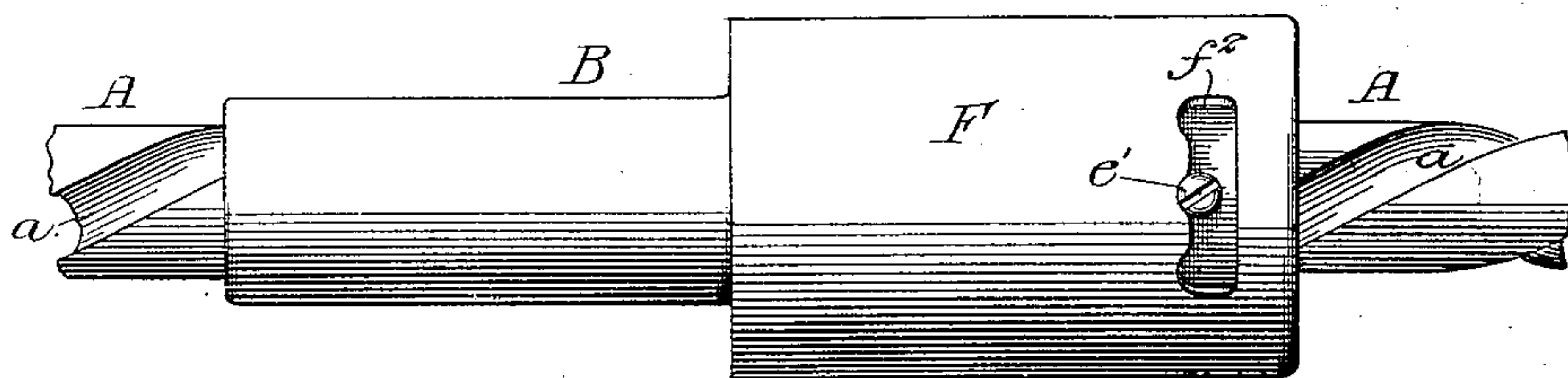


Fig. 7.

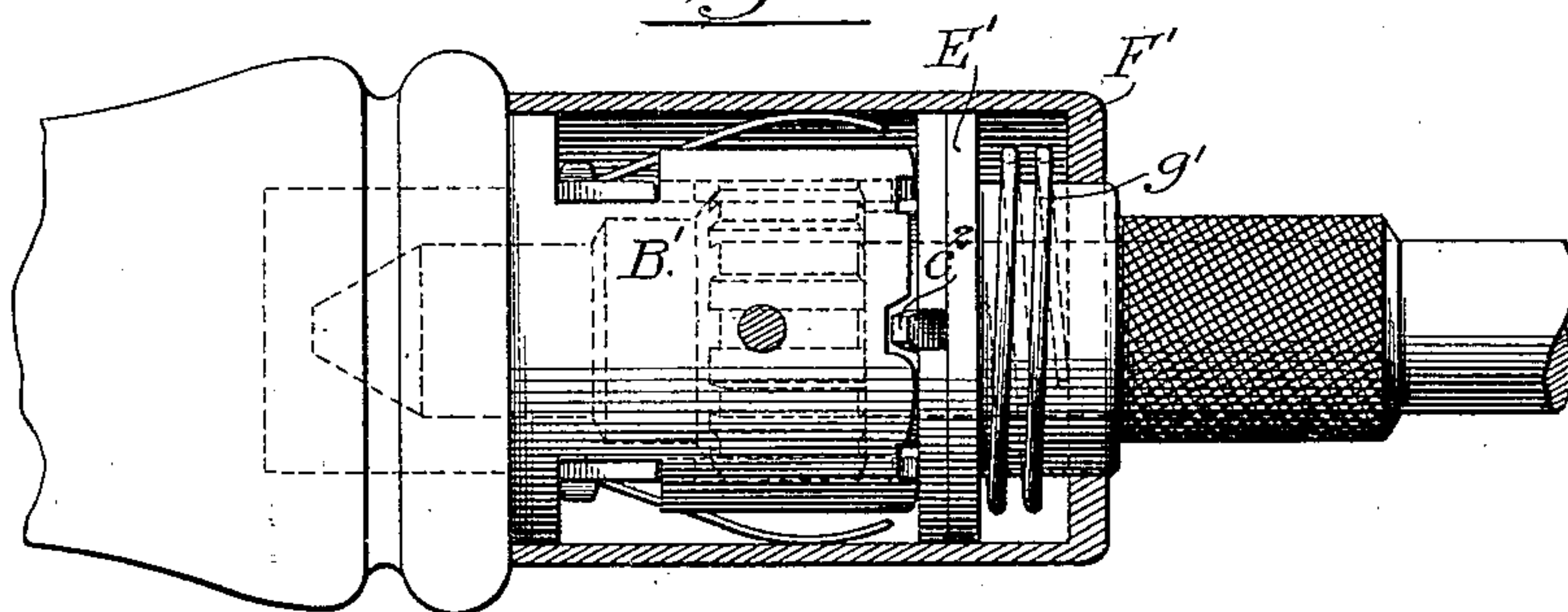


Fig. 8.

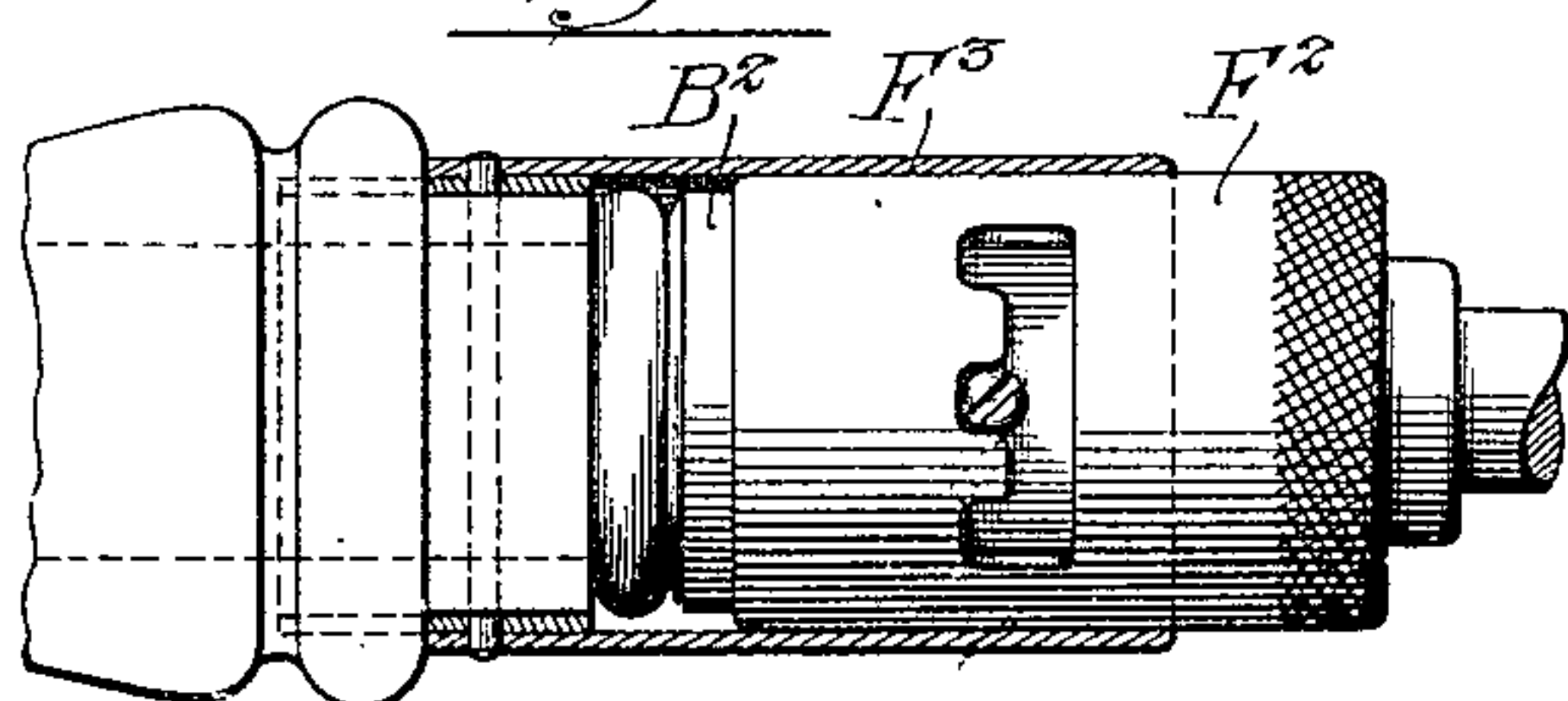


Fig. 9.

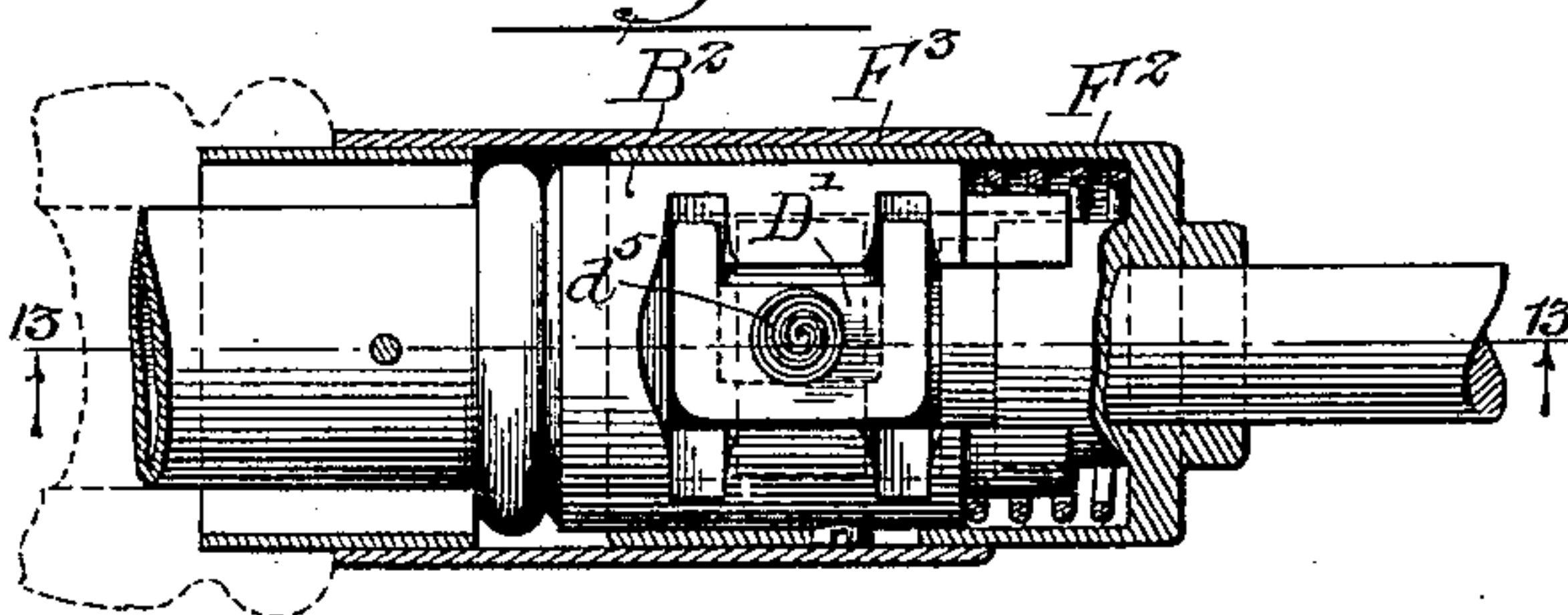


Fig. 10.

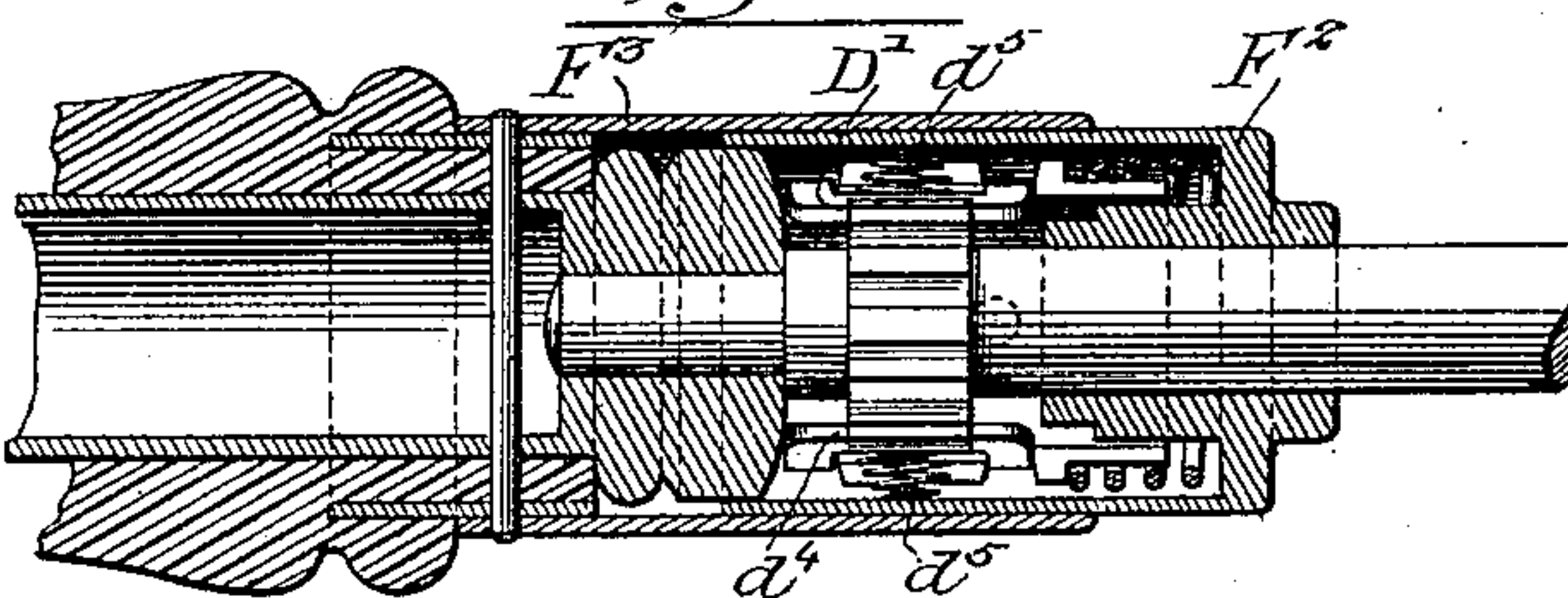


Fig. 12.

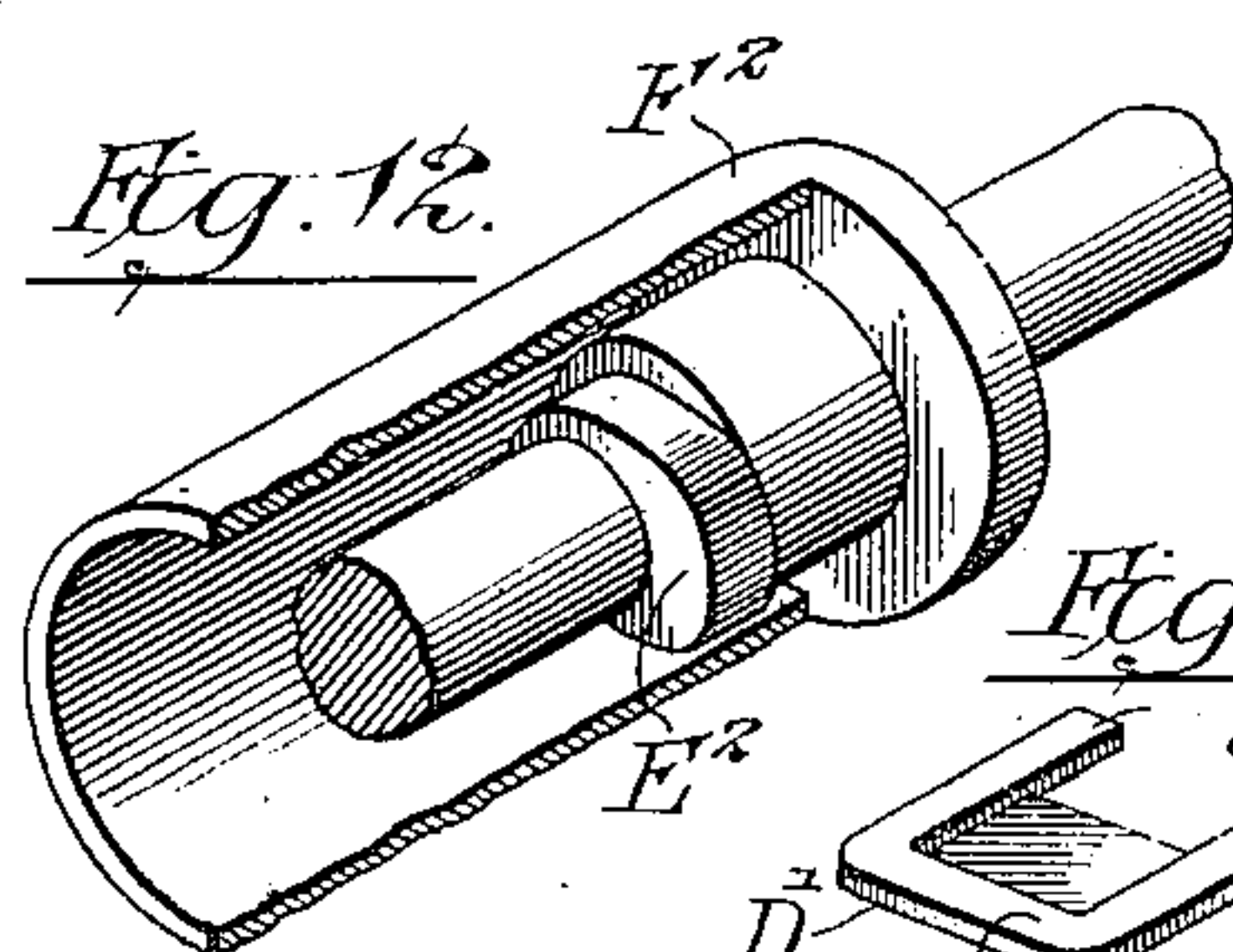


Fig. 11.

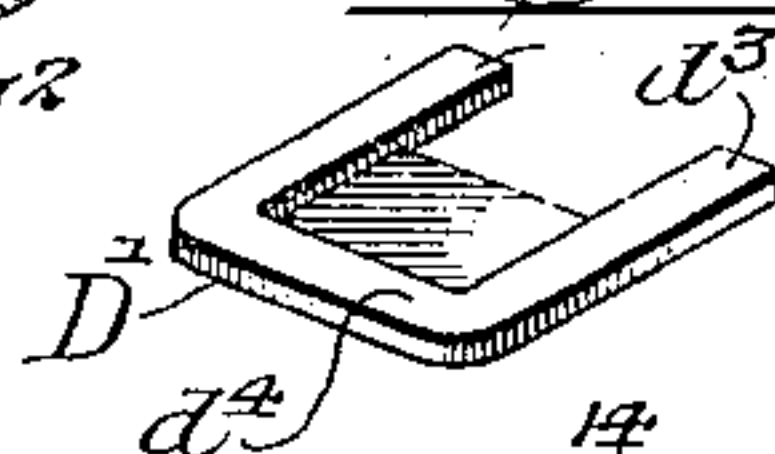


Fig. 13.

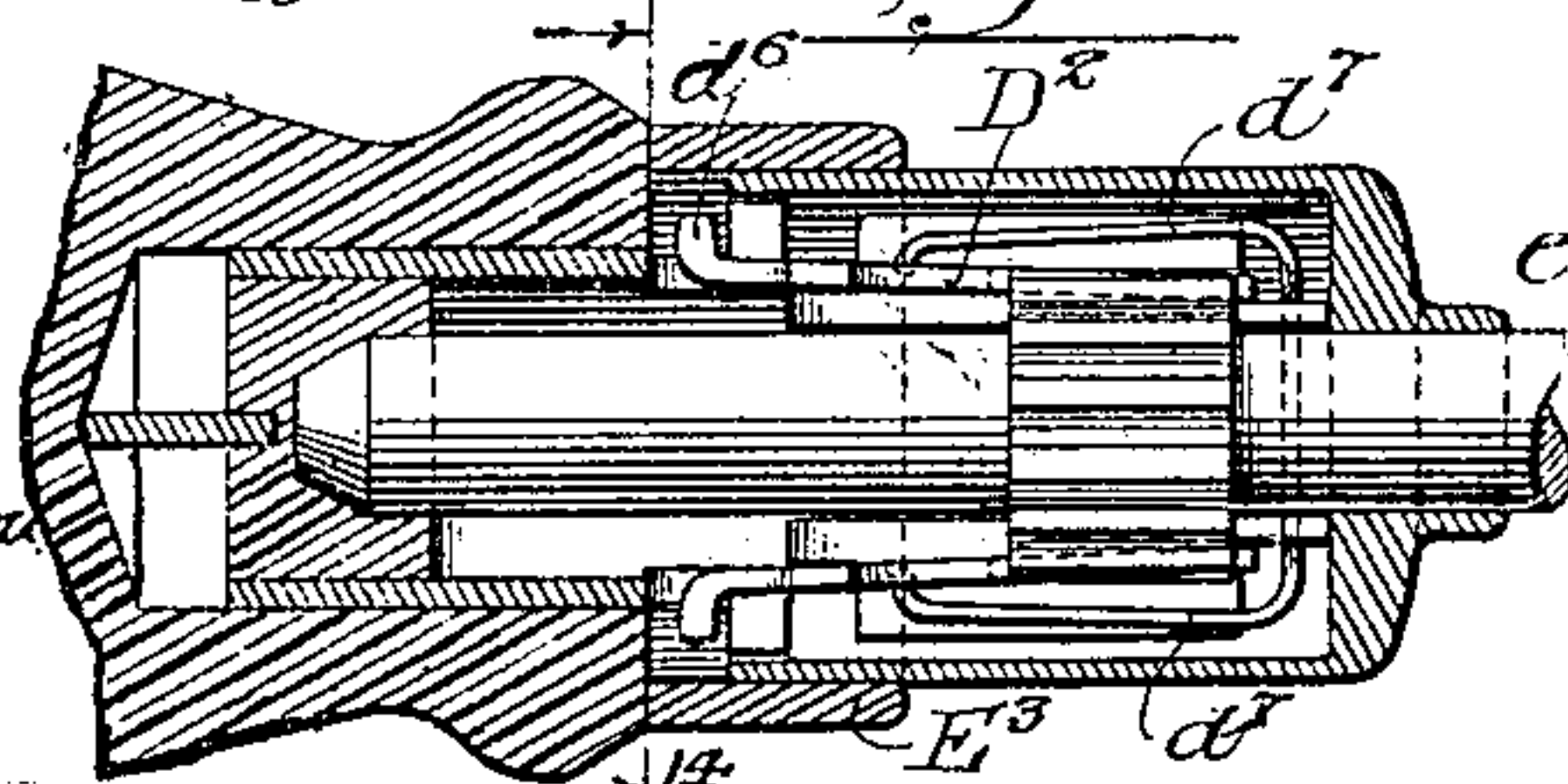
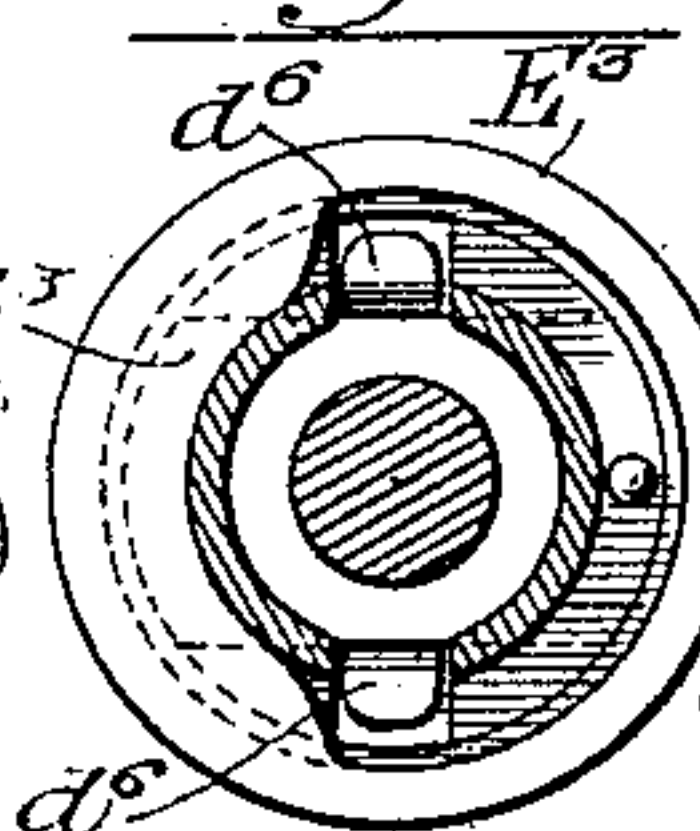


Fig. 14.



Witnesses:
Louis H. Whitehead
Charles H. Brown

Inventor:
Zachary T. Furbish
by his Attorneys:
Howson & Howson

UNITED STATES PATENT OFFICE.

ZACHRY T. FURBISH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
NORTH BROTHERS MANUFACTURING COMPANY, OF SAME PLACE.

RATCHET MECHANISM.

SPECIFICATION forming part of Letters Patent No. 666,508, dated January 22, 1901.

Application filed June 25, 1898. Serial No. 684,446. (No model.)

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 Mechanism, of which the following is a specification.

My invention relates to certain improvements in ratchet mechanism illustrated and claimed in the patent granted to me on November 2, 1897, No. 593,157.

The main object of my present invention is to make a compact tool and to arrange mechanism for throwing the pawls into and out of engagement by turning the shifter.

15 In the accompanying drawings, Figure 1 is a longitudinal sectional view illustrating my improved ratchet mechanism. Fig. 2 is a plan view with the casing removed. Fig. 3 is a section on the line $x x$, Fig. 2, looking in
20 one direction. Fig. 4 is a sectional view on the line $x x$, Fig. 2, looking in the opposite direction. Fig. 5 is a perspective view showing the parts detached. Fig. 6 is an exterior view. Fig. 7 is a sectional view showing a
25 different form of shifter. Figs. 8, 9, 10, 11, and 12 are views showing still another form of shifter and a modification of the pawl, and Figs. 13 and 14 are views showing the shifter acting upon the tail of the pawl.

30 Referring to Figs. 1 to 6 in the first place, A is the spiral-grooved spindle of a drill or screw-driver stock. B is a hub adapted to slide upon the spindle A. The enlarged portion of this hub is slotted, forming two abutments $b b$, between which the pawls D D
35 rest. The hub B has two transverse slots b' at the end of the slots forming the abutments, and adapted to rest in these transverse slots are the trunnions $d d$ of the pawls D. The
40 body of the pawls fits snugly between the abutments $b b$, and each pawl has a narrow extension d' , which rests against one of the abutments b .

45 Mounted on the spindle A and within the hub B is a ratchet-wheel C, having teeth c , preferably of the form shown in Fig. 3, and a key or internal rib c' , which enters the groove a in the spindle A, so that the ratchet-wheel while it is free to slide longitudinally

on the spindle must turn thereon as directed 50
by the spiral groove a . The ratchet-wheel snugly fits the recess between the abutments, so that when the extension d' of the pawl drops in front of one of the teeth the pressure will be directly against the abutments. 55
This general construction is fully illustrated and claimed in my patent alluded to above.

In order to readily throw into and out of action the pawls D, I allow the projection d' of the pawls to extend beyond the ratchet-wheel, as shown in Fig. 2, and the extreme ends of the pawls are preferably beveled, as shown in Fig. 5.

Mounted in front of the hub B and loosely upon the spindle A is a shifter E, having projections $e e$, which enter the cavity b^2 in the end of the hub, so that when the shifter E is turned in one direction one of the projections e lifts the pawl out of engagement with the ratchet-wheel C without disturbing the other 70
pawl, so that when the tool is operated the spindle will be driven in one direction. By moving the shifter so as to lift the other pawl, allowing the one that was previously raised to engage with the teeth of the ratchet-wheel, 75
the spindle will be turned in the reverse direction when the tool is operated.

It will be noticed that the two pawls are so arranged that their extensions are directly opposite each other, so that when the shifter 80
is in the mid-position both pawls engage the ratchet-wheel, and consequently lock the ratchet-wheel to the hub, preventing the spindle from turning in either direction independently of the hub. 85

In the present instance each pawl carries its own spring d^2 , which is secured to the rear end of the pawl by lugs d^3 , formed by striking up the body of the pawl, making a recess into which the butt-end of the spring is placed. 90
Thus the springs are securely fastened to the pawls, and they are so arranged in respect to the pivot-point of the pawl as to tend to keep the extensions of the pawls in engagement with the ratchet-wheel. 95

Inclosing the main body of the hub and the shifter and serving to prevent the breaking of the former under strain is a casing F, hav-

ing a flange f at its outer end, and between this flange and the shifter E is a spring-washer g , which tends to keep the shifter in contact with the end of the hub. The casing is secured to the hub by a screw f' or other device and has a slot f^2 , through which projects a pin e' of the shifter E , so that the shifter can be operated by simply moving the pin e' in the slot in the casing F . In order to lock the shifter in its several positions, I notch the edges of the slot f^2 , so that the spring will force the pin e' of the shifter into one of the notches, and thus lock the shifter until moved purposely, Fig. 6.

In Fig. 7 I have shown the hub B' notched at the end, and in place of the shifter E , I substitute a shifter E' , which has a hub extending beyond the casing F' and preferably roughened, so that it can be grasped by the hand and turned. A spring g' is mounted between the end of the casing and the shifter, so as to force the lug e^2 of the shifter into any one of the notches in the hub.

In the device shown in Figs. 8 to 12, inclusive, the shifter is in the form of a cam E^2 and is carried by a stem which forms part of the casing F^2 . The other portion F^3 of the casing is fixed, and in place of the pawl D , as shown in Fig. 5, I have illustrated a pawl D' , having parallel cams d^3 , adapted to recesses in the hub B^2 , said arms being connected by a cross-bar d^4 , which is the equivalent of the extension d' of the pawl D . I have also shown a coiled spring d^5 interposed between each pawl and the casing F^2 , so as to keep the pawls in engagement with the ratchet-wheel, except when forced out by the cam E^2 .

Figs. 13 and 14 show a shifter adapted to act upon the rear ends of the pawls. Each pawl D^2 has a rear extension d^6 , and on the shifter E^3 is a cam-shaped projection e^3 , which when the shifter is turned in one direction will press down one pawl, throwing it out of gear with the ratchet-wheel, and when turned in the opposite direction will shift the other pawl. A single spring d^7 is used in this case, which rests upon both pawls, as shown.

I claim as my invention—

1. The combination in a ratchet mechanism, of the spindle, a hub mounted thereon, a ratchet-wheel within the hub and engaging with the spindle, a pawl pivoted to the hub and adapted to rest between one of the teeth of the ratchet-wheel and the abutment on the hub, with a laterally-movable shifter adapted to engage the pawl and move it out of engagement with the ratchet-wheel, substantially as described.
2. The combination in a ratchet mechanism, of the spindle, a hub mounted thereon, a ratchet-wheel within the hub and engaging with the spindle, a pawl pivoted to the hub and adapted to rest between one of the teeth of the ratchet-wheel and the abutment on the hub, with a laterally-movable shifter adapted

to engage the outer end of the pawl and lift it out of engagement with the ratchet-wheel, substantially as described.

3. The combination of a spindle, a hub, two pawls mounted on the hub, a ratchet-wheel on the spindle and within the hub, with which the pawls engage, with a laterally-movable shifter mounted on the spindle at the end of the hub and adapted to act upon the ends of the pawls so as to throw one or other of the pawls out of engagement with the ratchet-wheel, substantially as described.

4. The combination of a spindle, a hub slotted longitudinally to form two abutments and slotted transversely at the ends of the abutments to form pivot-bearings, pawls having trunnions adapted to the bearings in the hub and to work in the longitudinal slots, a ratchet-wheel within the hub, two pawls extending beyond the ratchet-wheel, a shifter mounted on the spindle at the end of the hub and having projections, one adapted to engage with one pawl and the other with the other pawl and springs tending to keep the pawls in engagement with the ratchet-wheels, substantially as described.

5. The combination of a hub, a spindle, a spiral groove therein, a ratchet-wheel mounted on the spindle and having a key adapted to the spiral groove, an abutment on the hub, said hub having bearing-slots, two pawls having trunnions adapted to the bearing-slots and having an extension adapted to rest against the abutment and engage with the ratchet-wheel, springs carried by the pawls, with a laterally-movable shifter engaging the pawls and adapted to move one or the other out of engagement with the ratchet-wheel, substantially as described.

6. The combination of the spindle, a hub, a ratchet-wheel mounted on the spindle within the hub, two pawls adapted to engage with the ratchet-wheel, a shifter at the end of the hub having a projection adapted to engage the ends of the pawls, a sleeve inclosing the pawls and a spring-washer between the flanged end of the sleeve and the shifter, substantially as described.

7. The combination of the hub, a spindle mounted therein, a ratchet-wheel on the spindle within the hub, pawls pivoted to the hub and adapted to engage the opposite sides of the ratchet-wheel, springs carried by the pawls, and a casing for inclosing said parts, substantially as described.

8. A pawl for ratchet mechanisms having trunnions at one end of the same on both sides, an extension on one side at the opposite end, and having a flat spring rigidly secured to the end carrying the trunnions, substantially as described.

9. The combination of a spindle, a hub, a ratchet-wheel mounted on the spindle, a pawl having trunnions and an extension adapted to be engaged by the teeth of the ratchet-wheel, the said extension projecting beyond

the end of the ratchet-wheel and beveled on
the underside, with a rotatable shifter having
a projection adapted to engage with the bevel
portion of the pawl and to lift it out of engage-
ment with the ratchet-wheel, substantially as
described.

5 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.