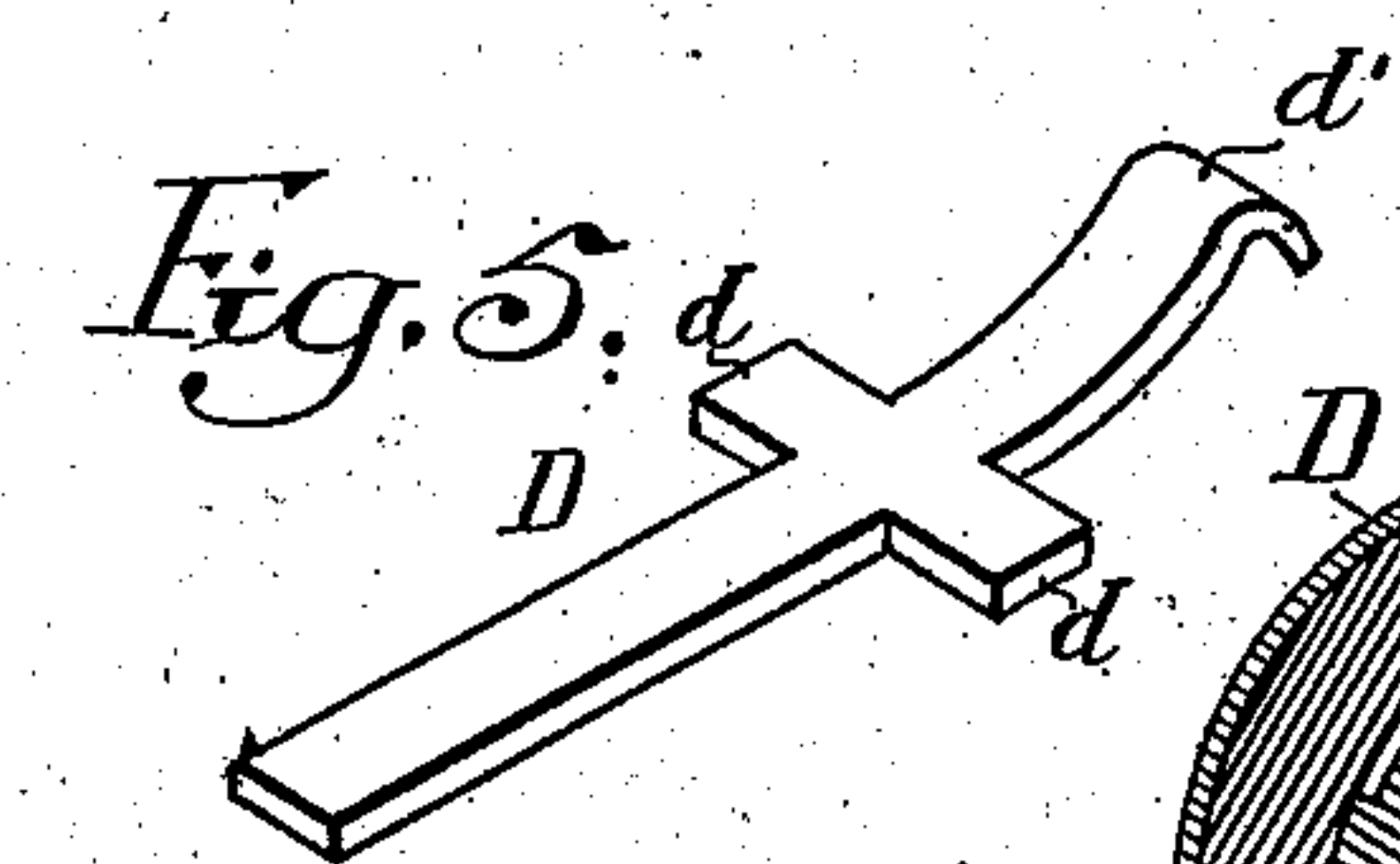
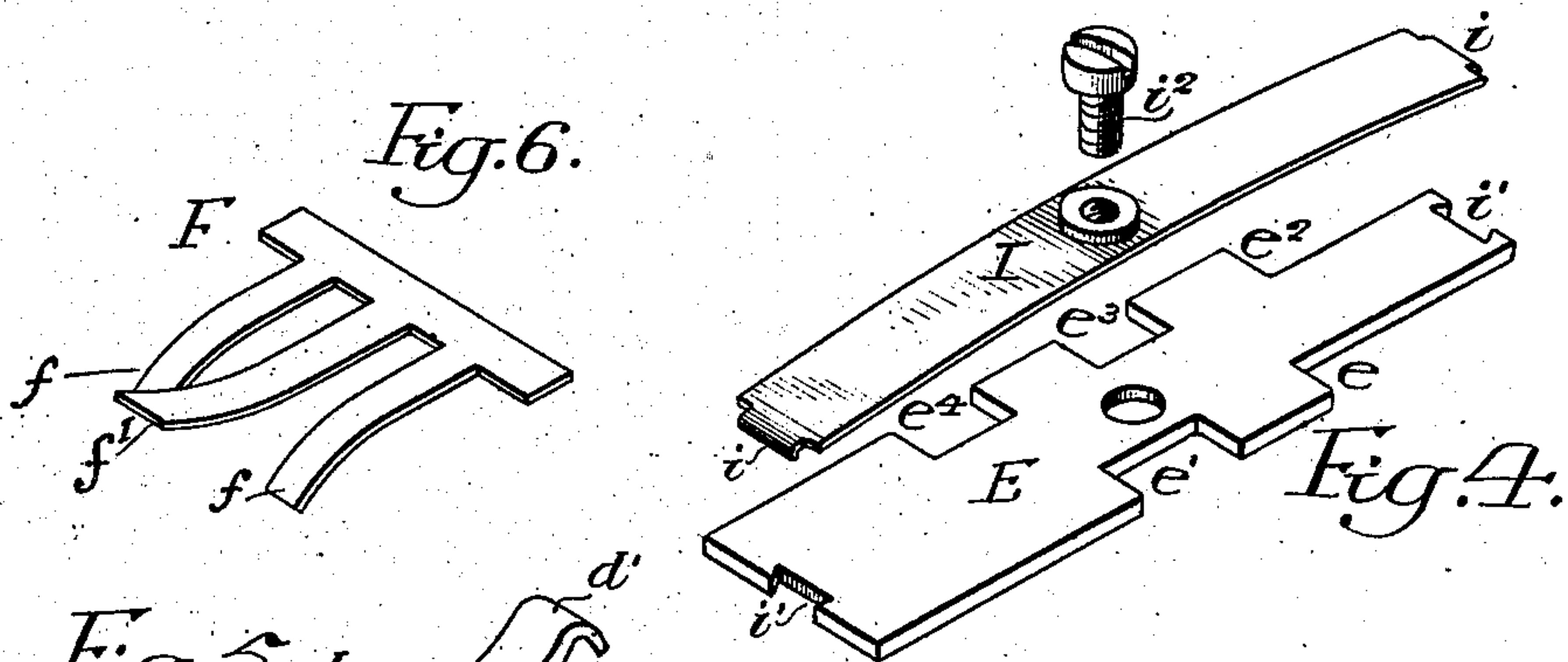
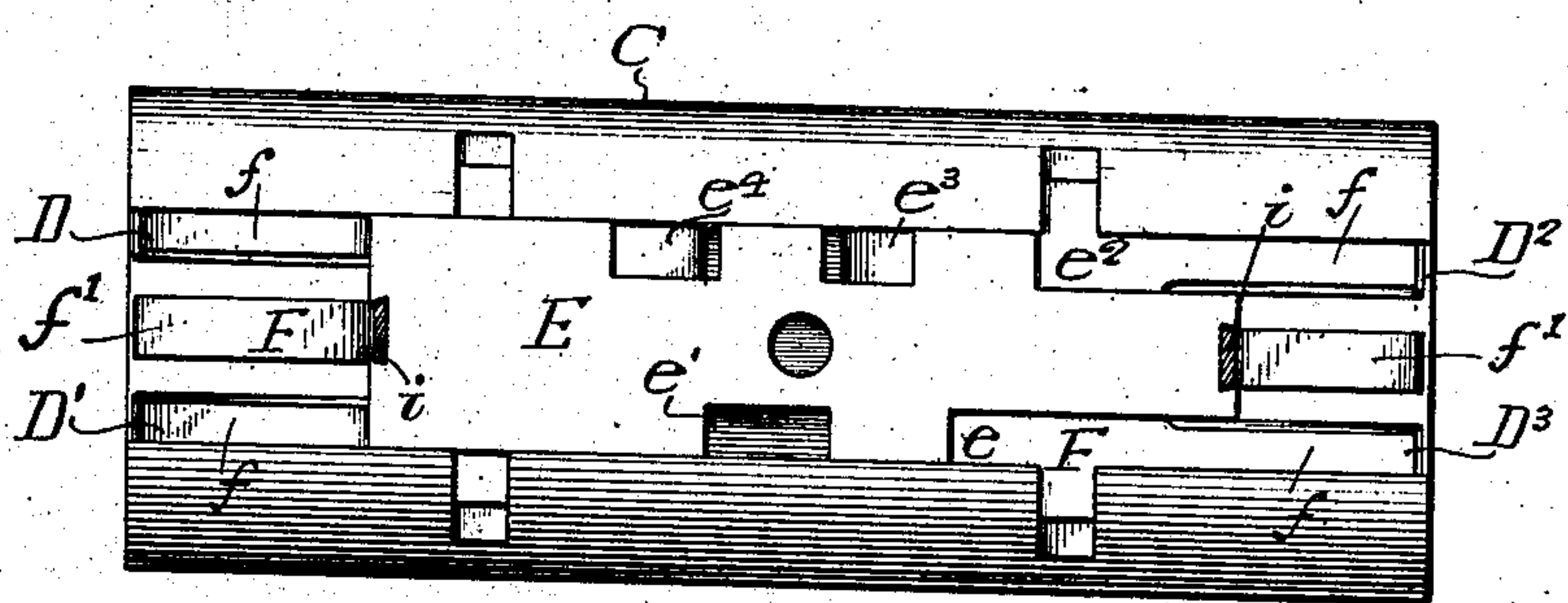
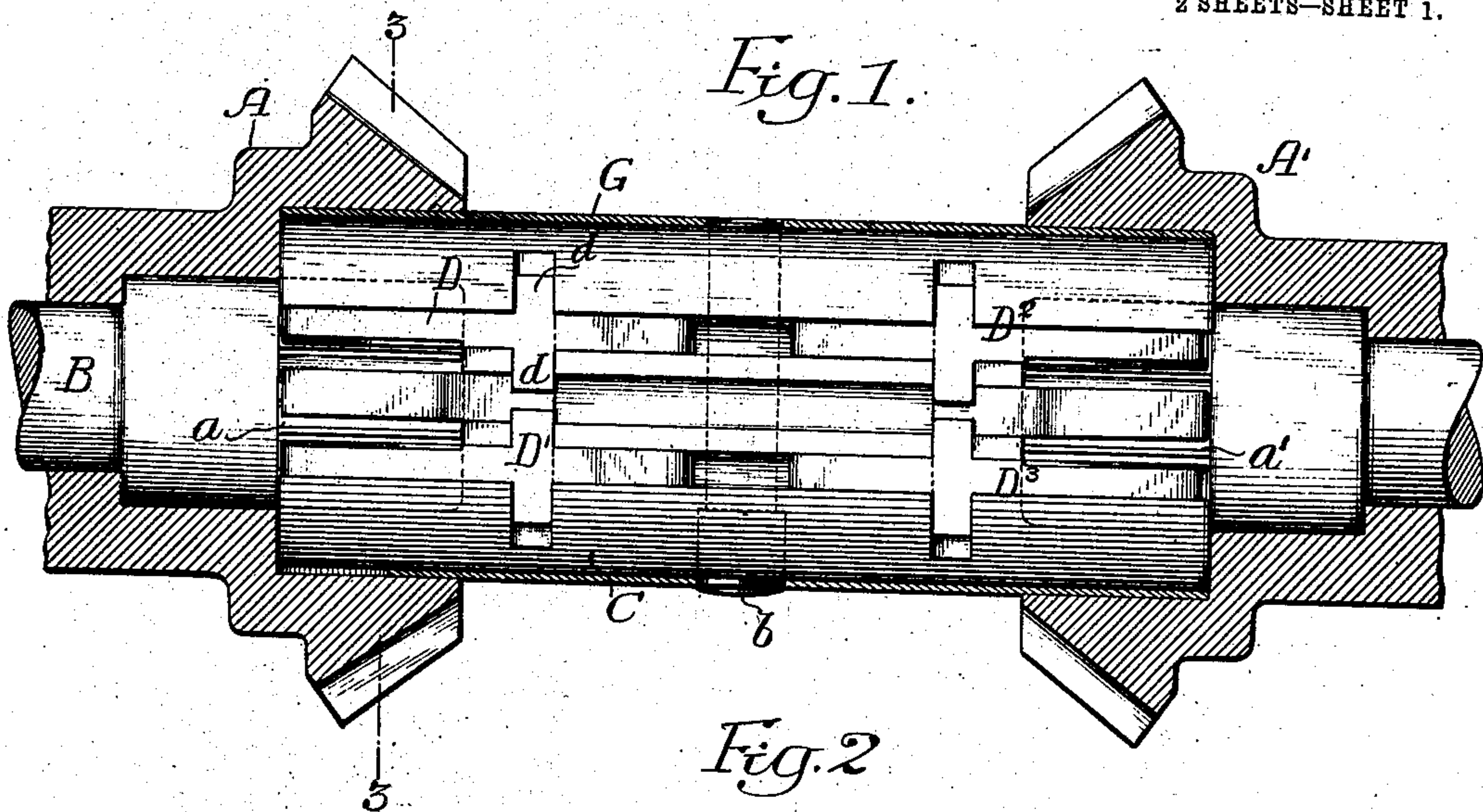


No. 894,673.

PATENTED JULY 28, 1908.

G. O. LEOPOLD.
RATCHET MECHANISM.
APPLICATION FILED FEB. 15, 1908.

2 SHEETS—SHEET 1.



Witnesses:
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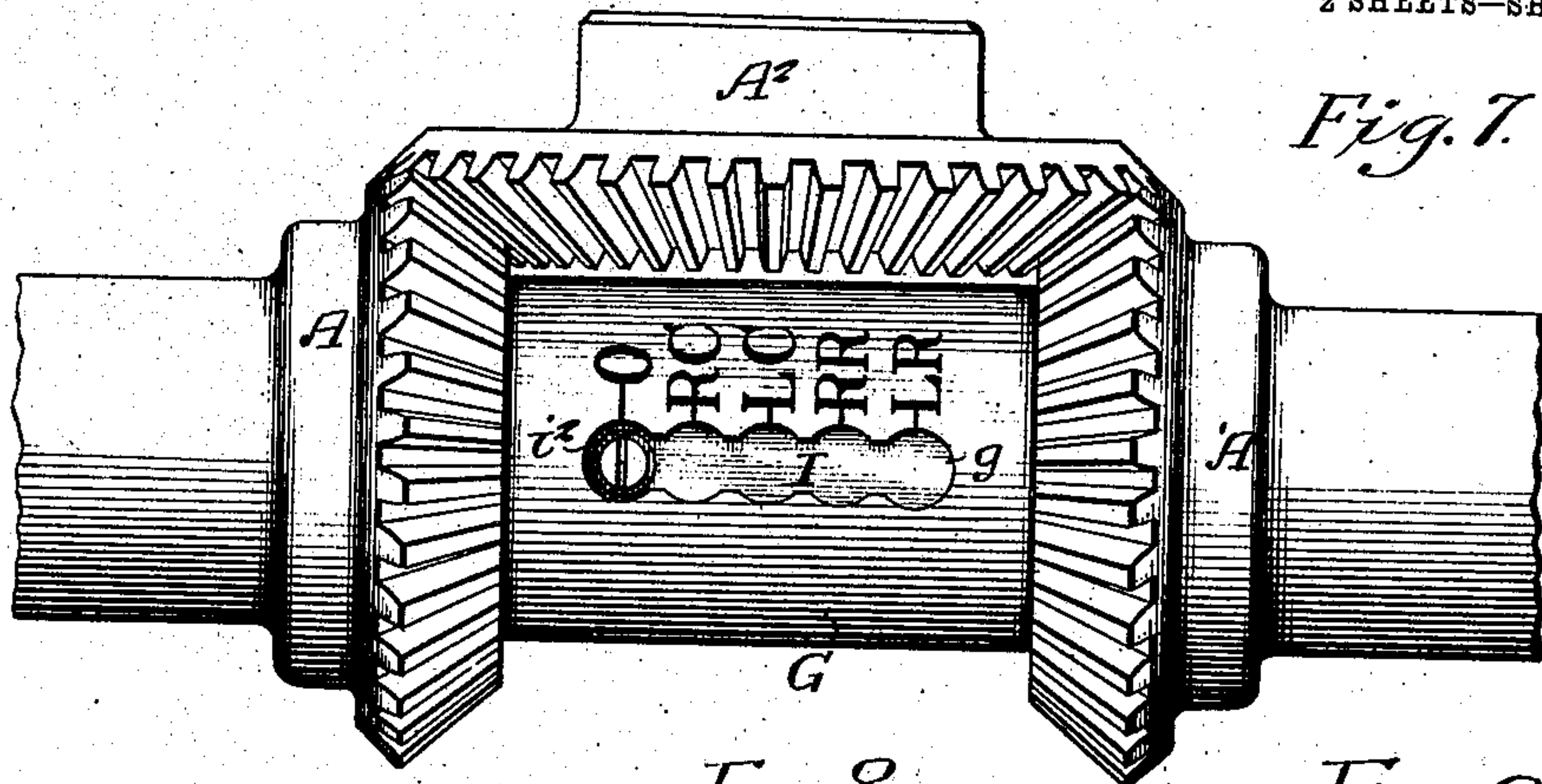


Fig. 7.

Fig. 8.



Fig. 9.

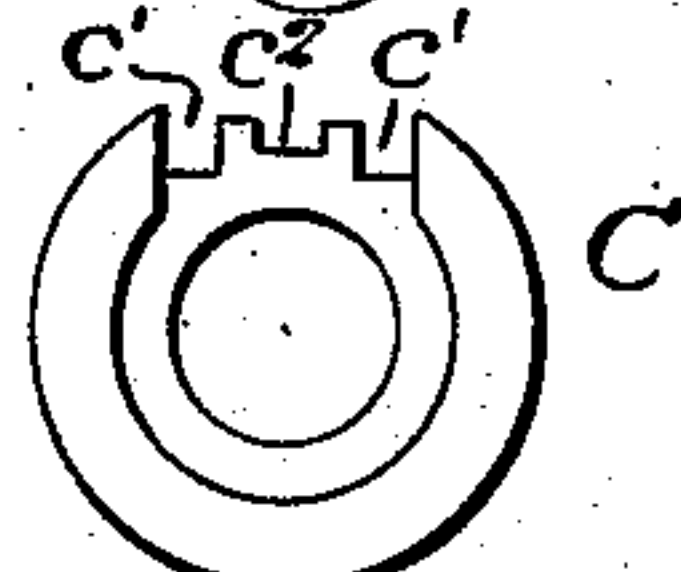


Fig. 10.

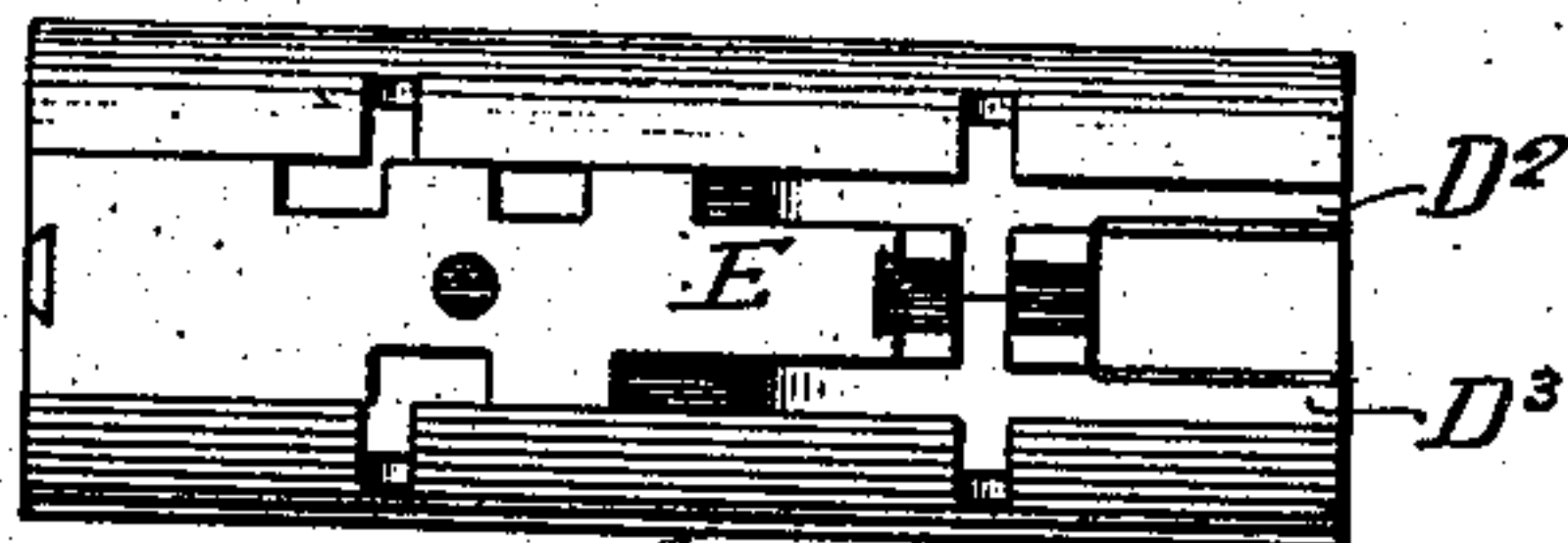


Fig. 11.

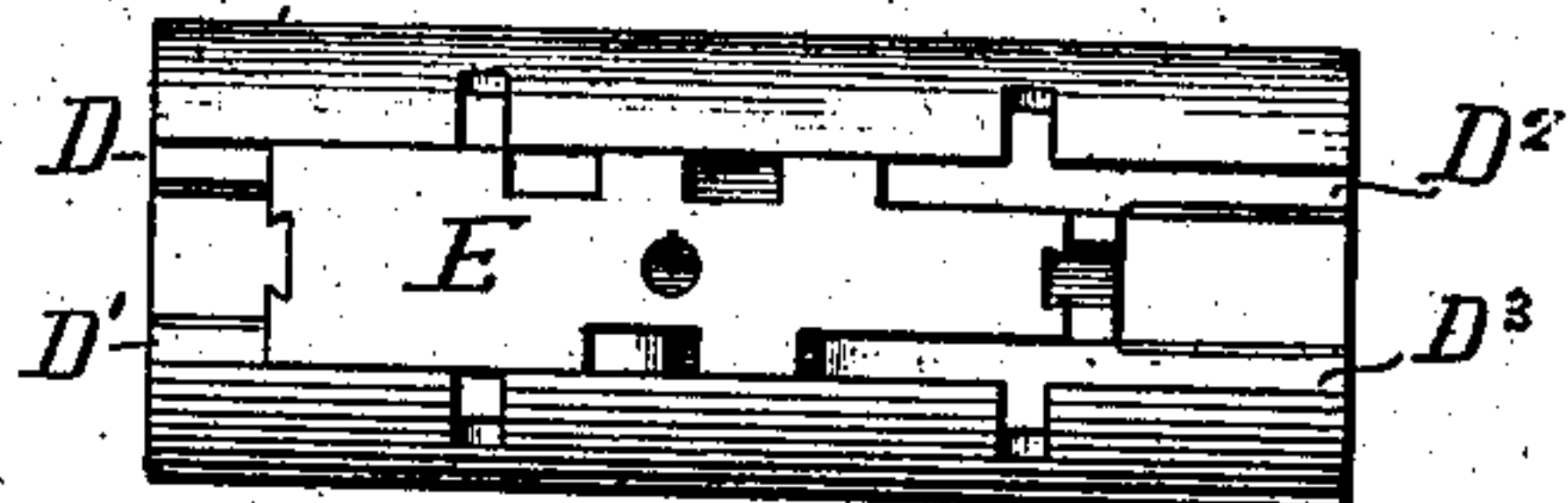


Fig. 12.

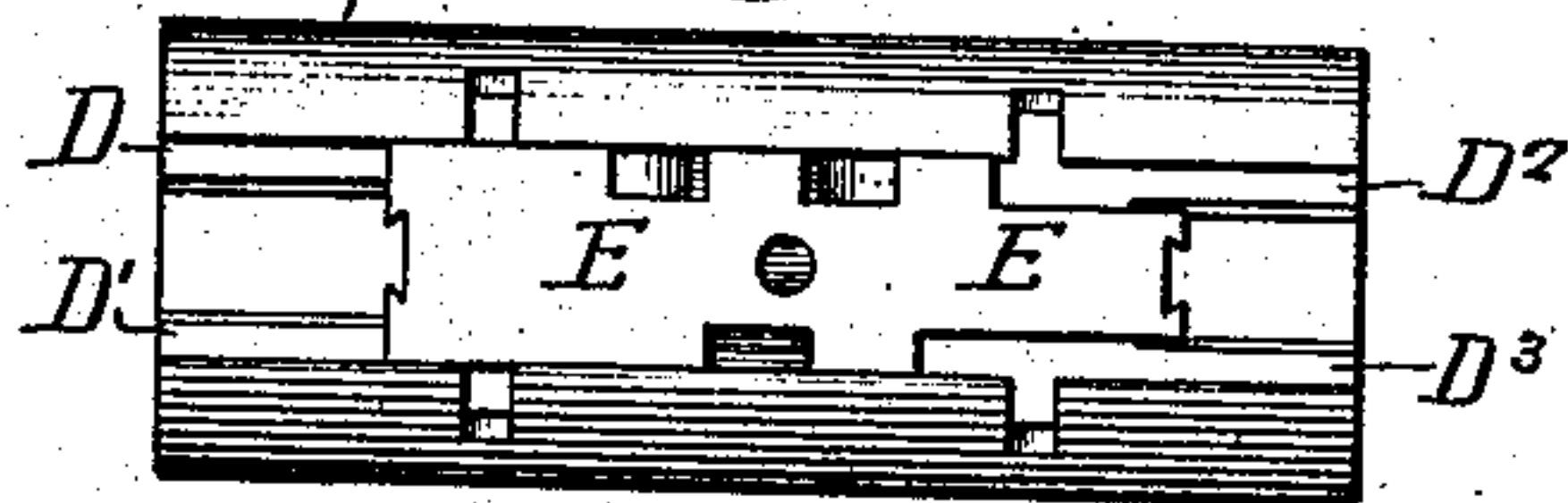


Fig. 13.

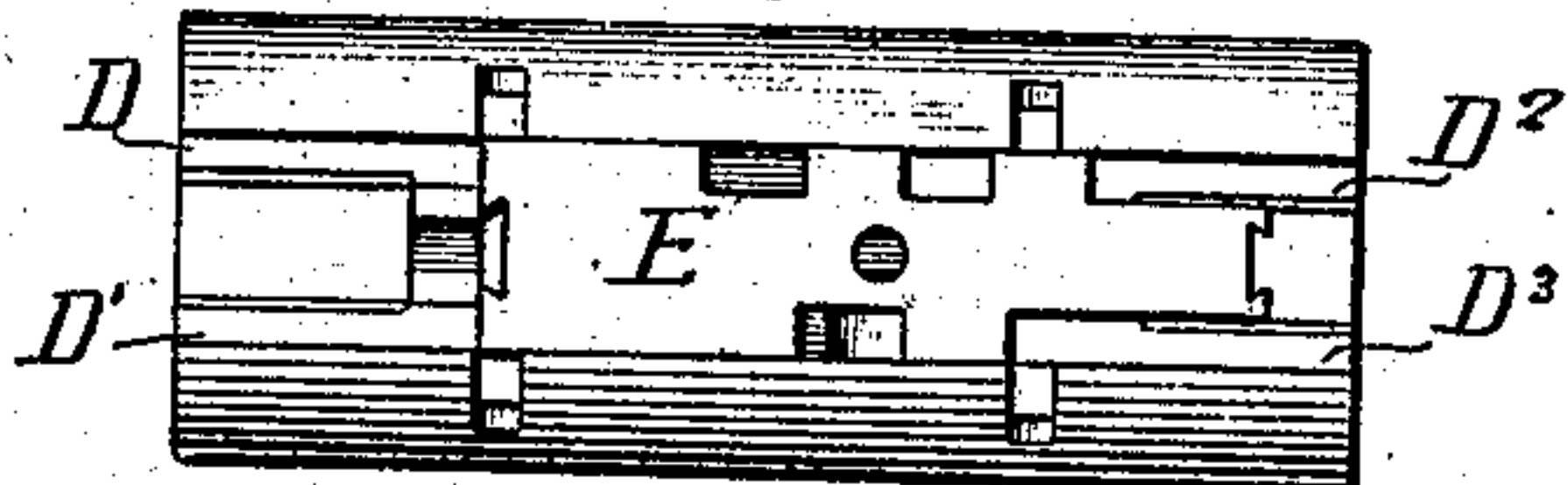
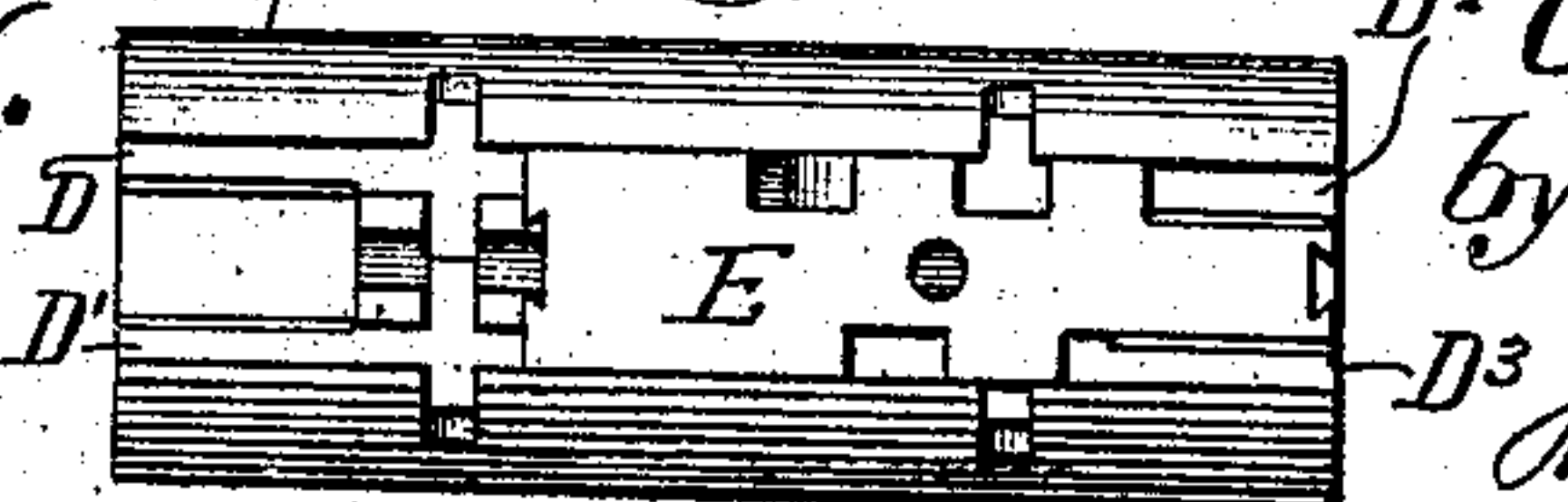


Fig. 14.



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UNITED STATES PATENT OFFICE.

GEORGE O. LEOPOLD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO NORTH BRO'S. M'F'G CO., OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

RATCHET MECHANISM.

No. 894,673.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed February 15, 1908. Serial No. 416,025.

To all whom it may concern:

Be it known that I, GEORGE O. LEOPOLD, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Ratchet Mechanism, of which the following is a specification.

My invention relates to certain improvements in ratchet mechanism especially adapted for use in connection with tools, such as drills and screw drivers, although the ratchet mechanism may be applied to other devices or machines without departing from my invention.

The object of my invention is to so construct a ratchet mechanism that the pawls act independently and the mechanism can be so shifted as to throw any of the pawls into action, or a certain pair of pawls into action. This object I attain in the following manner, reference being had to the accompanying drawings, in which:—

Figure 1, is a longitudinal sectional view illustrating my improved ratchet mechanism and showing the shifting plate removed; Fig. 2, is a plan view of the body portion showing the shifting plate in position; Fig. 3, is a sectional view on the line 3—3, Fig. 1, with the bevel wheel omitted; Fig. 4, is a detached perspective view of the shifting plate and its spring; Fig. 5, is a perspective view of one of the pawls; Fig. 6, is a perspective view of one of the pawl springs; Fig. 7, is a side view of the ratchet mechanism drawn to a reduced scale; Figs. 8 and 9, are views of the body portion with the parts detached; and Figs. 10, 11, 12, 13 and 14, are diagram views showing the shifting plate in different positions.

A, A' are two driving bevel wheels mounted loosely on the spindle B and driven from a common gear A².

C is a cylindrical body portion carrying the ratchet mechanism and secured to the spindle B by a pin *b*, which passes through the body portion and through the spindle so that the spindle must turn with the body portion. The body portion is slotted at each end as at *c*, Fig. 8, and is grooved at *c'*, *c*², the grooves being longitudinal and connecting with the slots at each end. The body portion is also notched at *c*³ for the reception of the pivot members *d*, *d* of the pawls D, Fig. 5. Each pawl has a rearwardly extending portion forming a tail piece *d'* and this

tail piece is slightly raised at the end and curved as shown clearly in Fig. 5, so that the slide E can readily actuate it.

There are four pawls in the present instance, referring to Figs 1, D, D', D², D³, and one pawl is entirely independent of the others. The pawls D, D' engage a ratchet wheel *a* on the bevel wheel A and the pawls D², D³ engage a ratchet wheel *a'* on the bevel wheel A'. The pawls are forced into gear with these ratchet wheels by the pawl springs F, Fig. 6, each of which has two arms *f*, *f* which rest on the pawls and a central arm *f'* which rests against the plate or the inclosing shell G.

The sliding plate is notched at *e*, *e'* on one side and at *e*², *e*³ and *e*⁴ on the opposite side on a line with the tail members *d'* of the pawls, and this slide can be adjusted longitudinally so that the tail members of any one or two of the pawls will be opposite the notches and will be allowed to engage the ratchet wheels; the plate keeping all of the other pawls out of gear. The plate is held in position by a spring I and at each end of this spring are projections *i*, *i* turned down to engage notches *i'* in each end of the plate E.

Adapted to the spring is a screw *i*² which extends through a slot *g* in the shell G and the head of this screw is of sufficient size that it can be readily shifted from one position to another, the slot being notched and marked to indicate the different points of adjustment, as clearly shown in Fig. 7. As illustrated in the diagrams, Figs. 10 to 14, both inclusive, the plate E can be adjusted to five different positions so as to produce five different movements of the spindle B.

As indicated by the letters in Fig. 7, the five movements are as follows:—The first is ordinary, that is the parts are shown locked so that there is no ratchet movement and the drive is direct from the driving shaft to the driven spindle; second is a right continuous movement; third is a left continuous movement; fourth is a right hand ratchet; and fifth is a left hand ratchet.

When the shifting plate E is in the first position, Fig. 10, the two pawls D², D³ are free and the other two pawls are held out of engagement with their ratchet wheel, thus locking the body portion rigidly to the gear A'. This is the ordinary position.

Fig. 11, shows the plate shifted to the second position, freeing the pawls D' and

D³ and holding the pawls D and D² out of engagement. Then the pawls are in position to effect a right continuous feed.

In Fig. 12, the plate E is shifted to the third position, freeing the pawls D and D² and holding the pawls D' and D³ out clear of the ratchet wheels; this will effect a left continuous movement.

Fig. 13, is the fourth position of the plate E and all the pawls, with the exception of the pawl D³, are held out of engagement, giving the spindle a right hand ratchet movement.

When the plate is in the fifth position, as shown in Fig. 14, all the pawls, with the exception of the pawl D², are held out of engagement, giving the spindle a left hand ratchet movement.

Thus it will be seen by the above construction that I am enabled to shift the pawls to produce different movements of the spindle by simply sliding the plate to one position or another.

While I have shown four pawls, three pawls may be all that is necessary for some types of ratchet mechanism.

I claim:—

1. The combination of a body portion, pawls mounted in the body portion, a ratchet wheel, and a sliding plate mounted above the pawls and adapted to hold certain pawls out of engagement while allowing the others to be free for engagement with the ratchet wheel.

2. The combination of a body portion, a series of pawls mounted in the body portion, a ratchet wheel and a notched plate mounted above the pawls, and means for sliding said plate over the pawls so as to hold certain pawls out of engagement with the ratchet wheel while another is free to engage with the ratchet wheel.

3. The combination of a body portion, pawls mounted in the body portion, two ratchet wheels arranged to be engaged by the pawls, a notched sliding plate mounted above the pawls, and means for sliding said plate so as to hold some of the pawls out of engagement with either of the ratchet wheels and release others of the pawls.

4. The combination of a body portion, pawls mounted therein, each pawl having a rearwardly projecting portion, a notched sliding plate mounted on the body portion above the pawls, a ratchet wheel, and means for shifting the plate so as to hold any one or more of the pawls out of engagement with the ratchet wheel.

5. The combination of a spindle, a body portion secured to the spindle, a driving ratchet wheel at each end of the body portion through which the spindle passes, a series of pawls on the body portion, a notched sliding plate, and means for shifting the

plate over the pawls, the said notches being so arranged that any one of the pawls may be free to engage the ratchet wheels, or certain ones of the pawls may be free to engage the ratchet wheels.

6. The combination of a spindle, a body portion secured to the spindle, two ratchet driving wheels one at each end of the body portion and adapted to turn freely on the spindle, four pawls pivotally mounted on the body portion, each pawl having a raised rear extension, a notched sliding plate mounted on the body portion, the notches alining with the tail pieces of the pawls and the notches being so arranged that certain of the pawls will be held out of engagement with the ratchet wheels as the plate is shifted from one position to another.

7. The combination of a spindle, a body portion mounted on the spindle and having ways, ratchet wheels at each end of the body portion, a series of pawls mounted on the body portion adapted to engage the ratchet wheels, each pawl having a rear extension, a spring member mounted at each end of the body portion, each member having three arms, two of said arms pressing against the pawls, a sliding notched plate mounted in the ways in the body portion and acting upon the rear extensions of the pawls, so as to hold certain pawls out of engagement with the ratchet wheels and allow others to be forced into engagement with the ratchet wheels by the springs.

8. The combination of a spindle, a body portion mounted on the spindle, ratchet wheels at each end of the body portion and independent thereof, said body portion being recessed at each end over the ratchet wheels, and having longitudinal slots extending from one recess to the other and also having transverse pivot slots, four pawls mounted in the longitudinal slots of the body portion and having pivot members adapted to the transverse pivot slots, each pawl having an upturned rearward extension, and a notched plate arranged to slide in the body portion over the pawls and to act upon the raised rear extensions of the pawls.

9. The combination of a body portion, four pawls mounted in the body portion, two pawls facing in one direction and the other two pawls facing in the opposite direction, each pawl having an upwardly extending tail piece, a plate E recessed at e , e' on one side and recessed at e^2 , e^3 and e^4 on the opposite side in line with the tail pieces of the pawls, whereby when the plate is in one position two pawls on one end are free, when moved into the second position a pawl at each end and at one side are free, when moved into the third position a pawl at each end on the opposite side is free; when moved into the fourth position one pawl at one side

is free; and when moved into the final position the pawl at one end on the opposite side is free, producing the results substantially as described.

5 10. The combination in a pawl and ratchet mechanism, of a body portion, a pawl pivotally mounted in the body portion, said pawl having a body, two transverse
10 extension, with a notched sliding plate

adapted to the body portion and acting upon the rear extension of the pawl.

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

15

GEORGE O. LEOPOLD.

Witnesses:

JOS. H. KLEIN,
WM. A. BARR.