

No. 621,528.

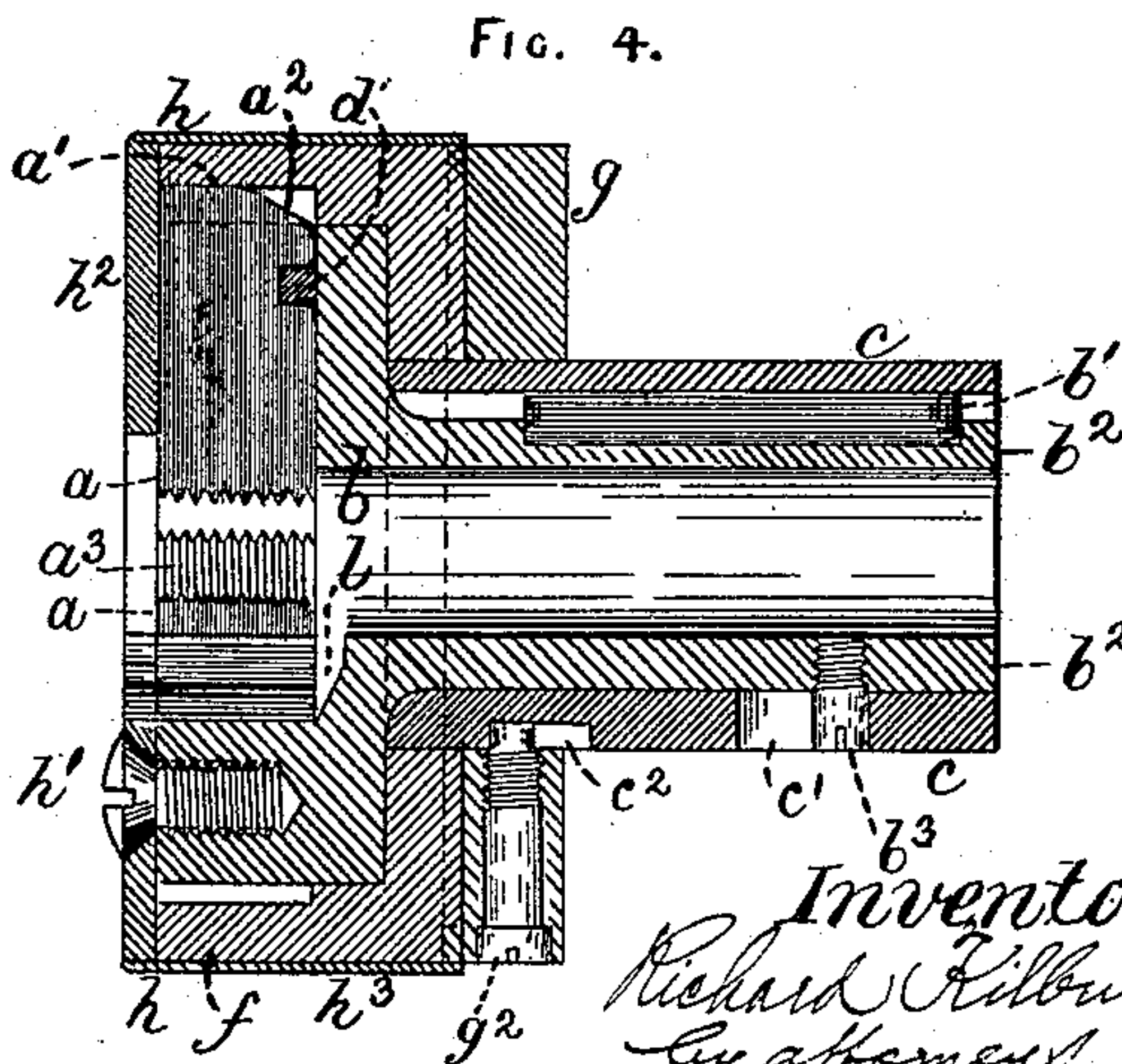
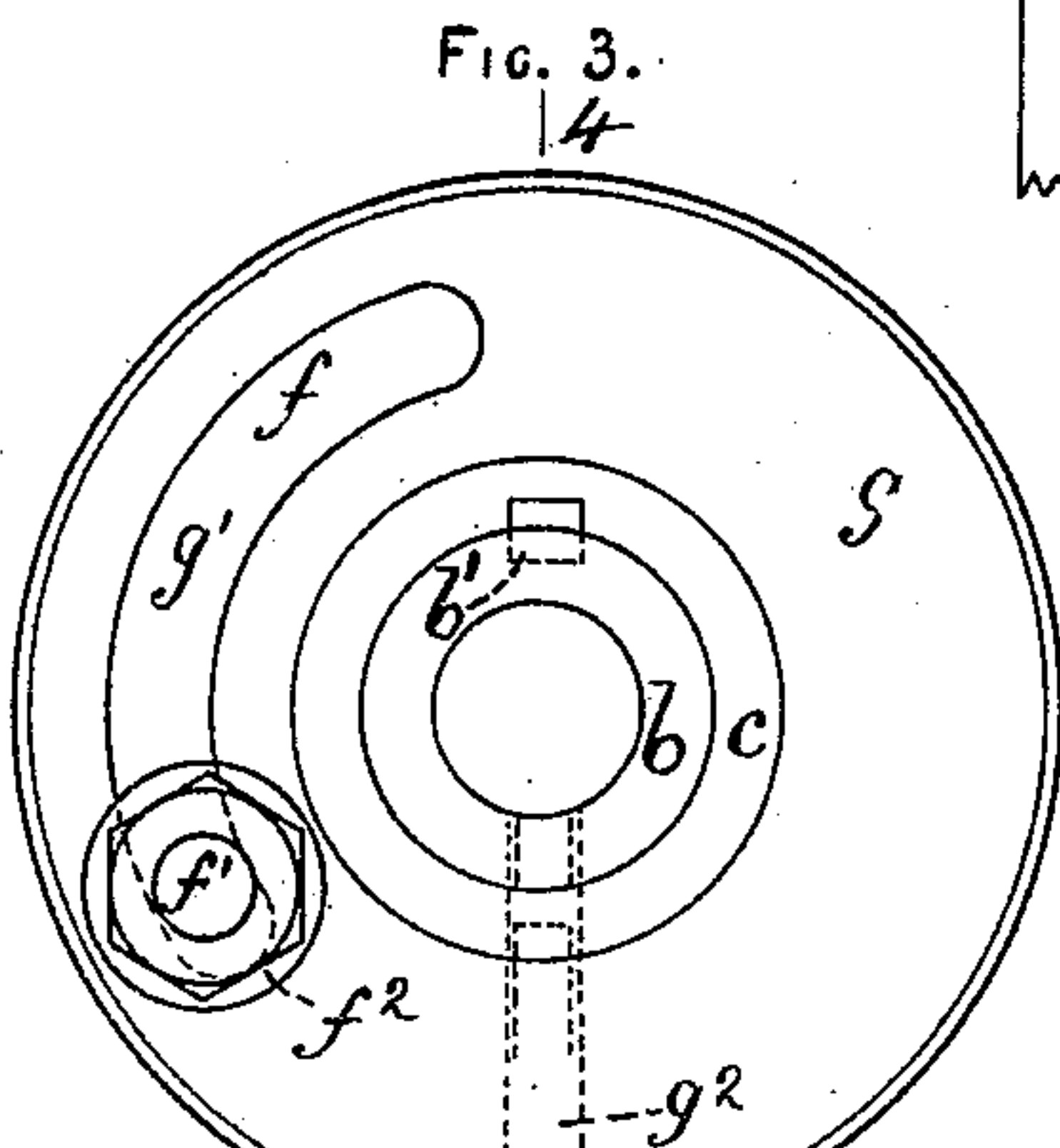
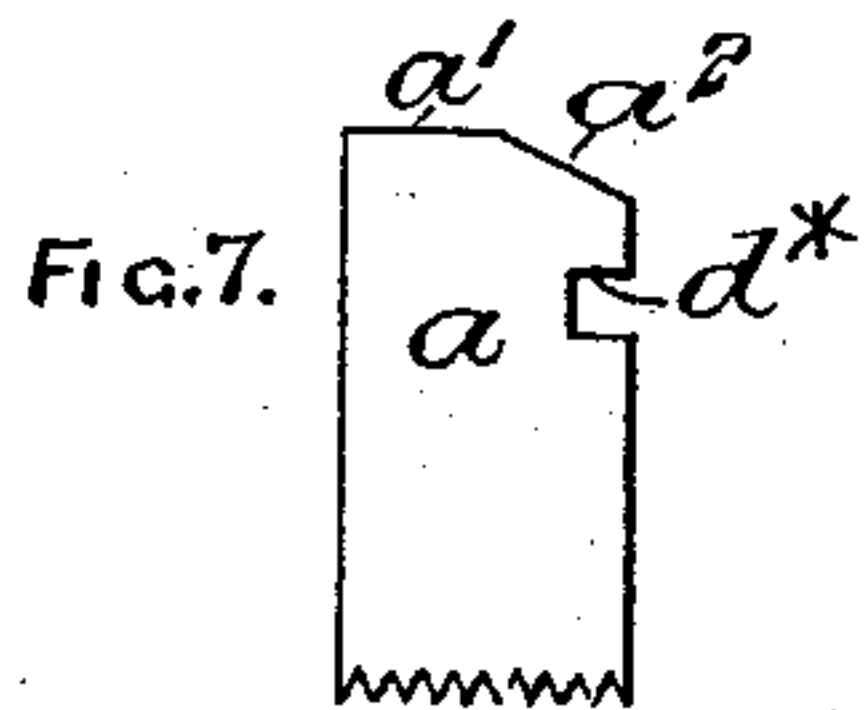
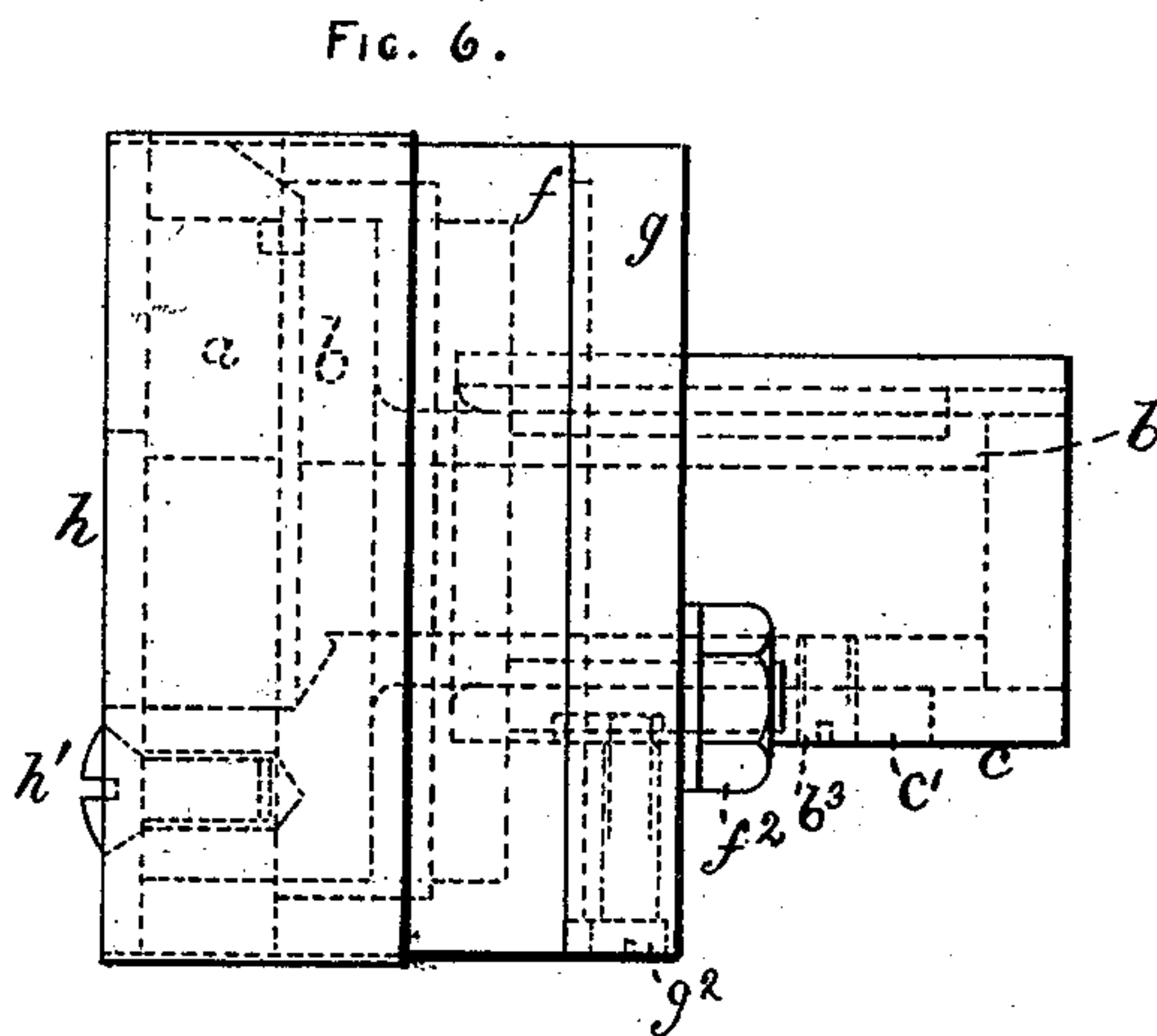
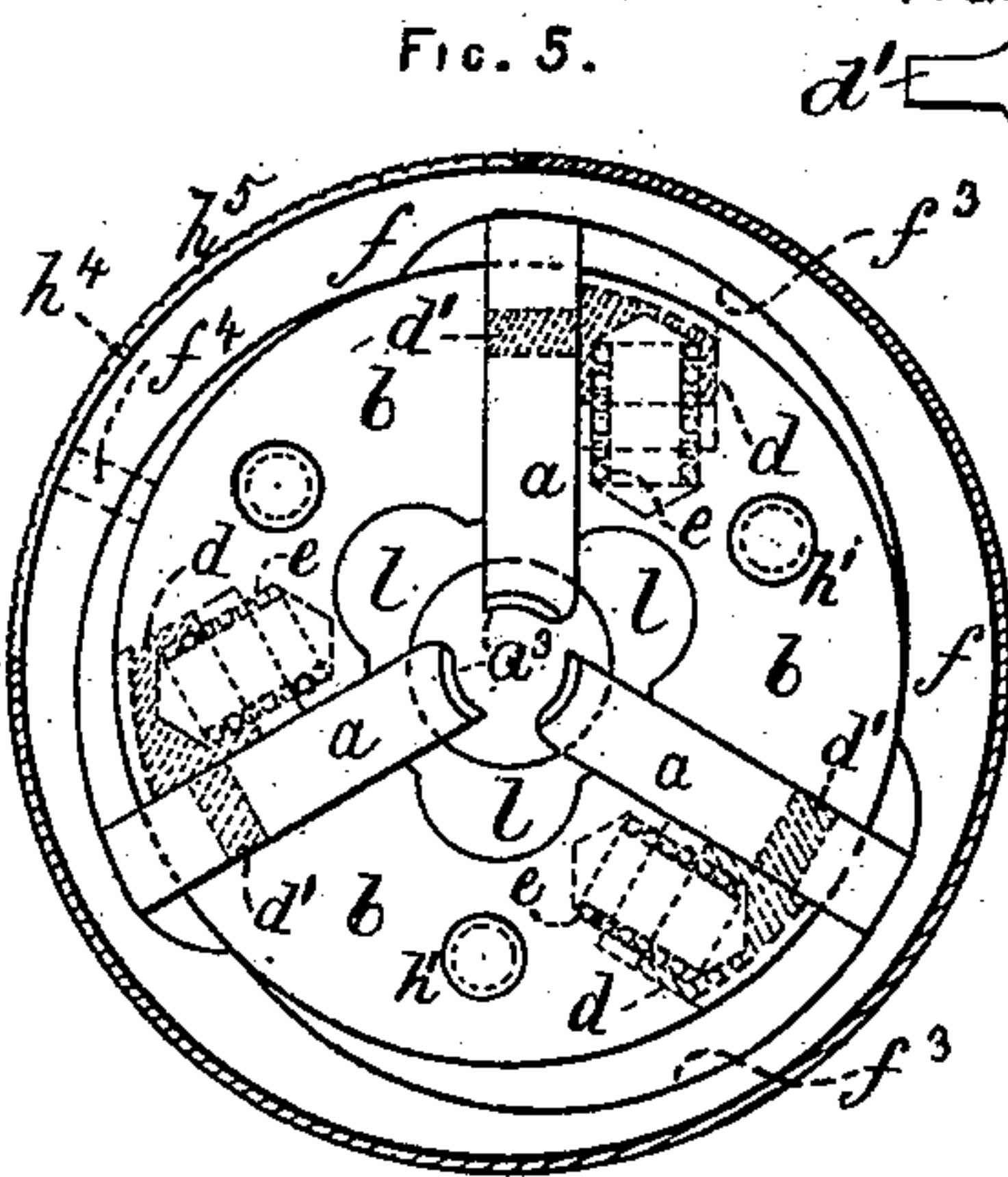
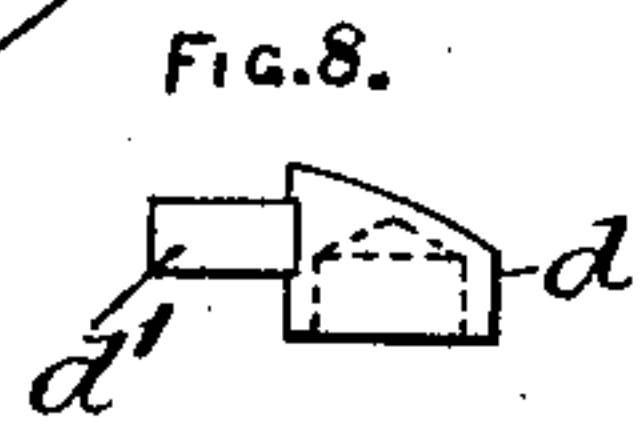
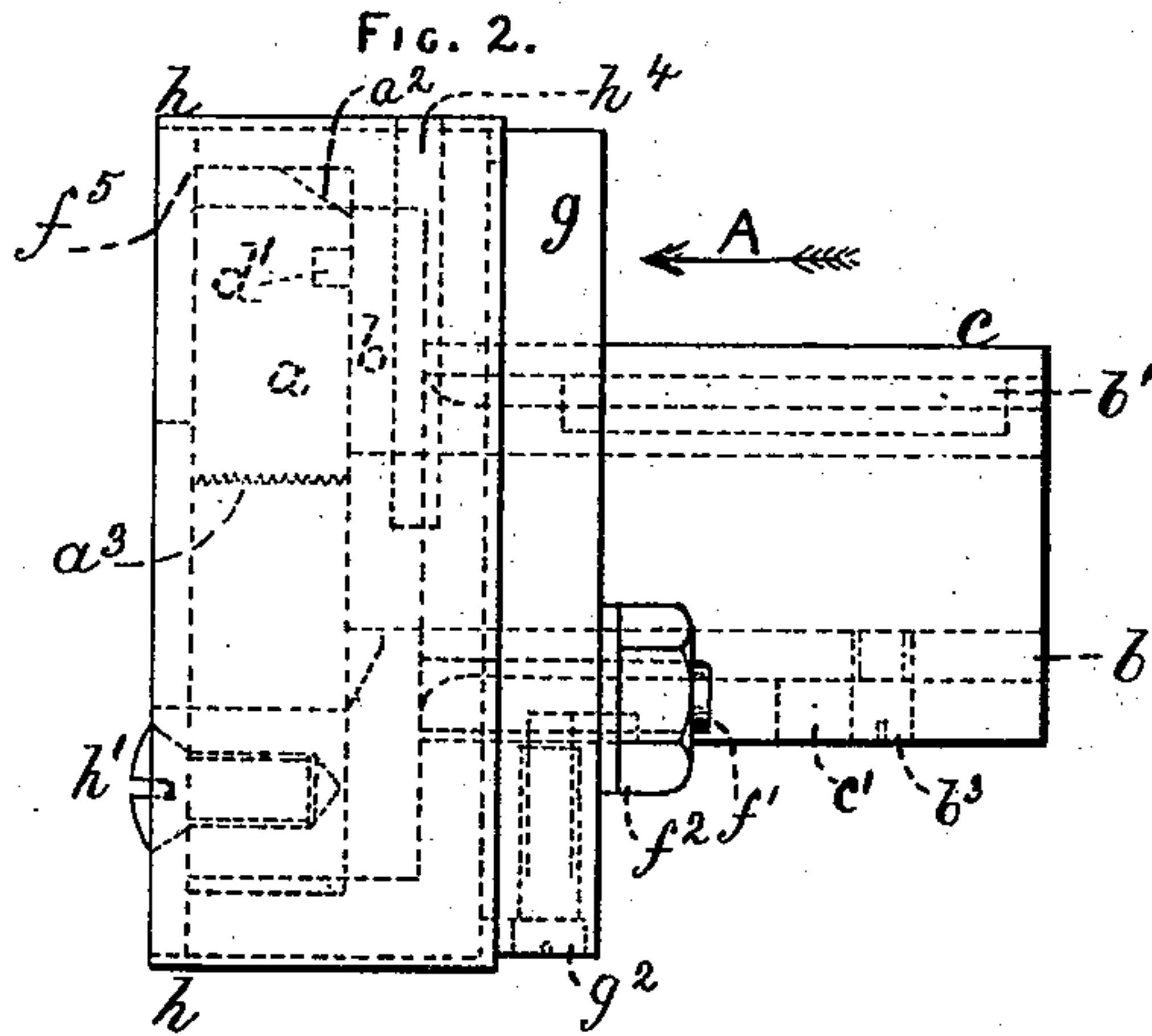
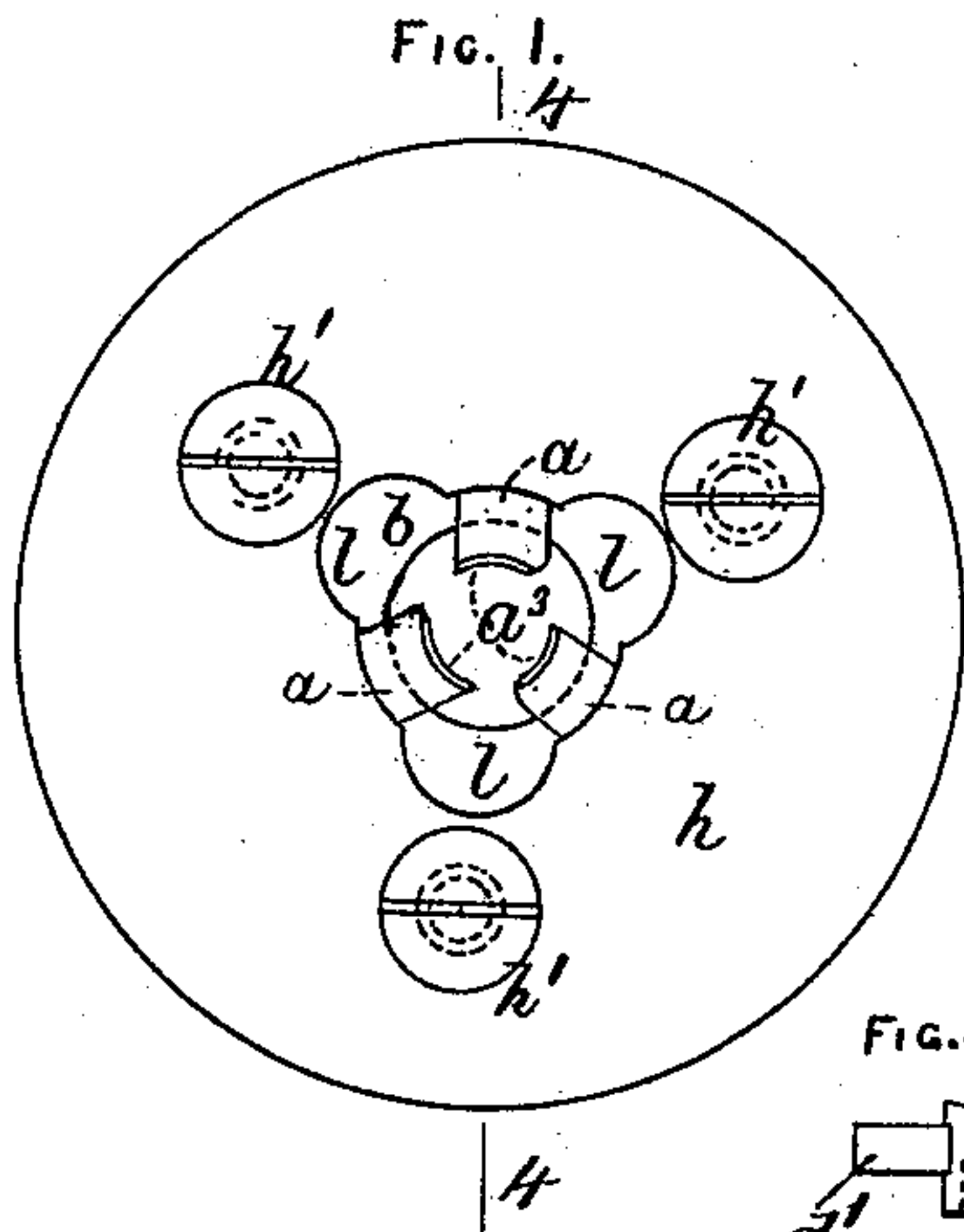
Patented Mar. 21, 1899.

R. KILBURN.

SCREWING APPLIANCE FOR FORMING SCREW THREADS ON BOLTS, &c.

(Application filed Dec. 27, 1897.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

RICHARD KILBURN, OF MANCHESTER, ENGLAND.

SCREWING APPLIANCE FOR FORMING SCREW-THREADS ON BOLTS, &c.

SPECIFICATION forming part of Letters Patent No. 621,528, dated March 21, 1899.

Application filed December 27, 1897. Serial No. 663,526. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD KILBURN, engineer, of 138 Church lane, Gorton, Manchester, in the county of Lancaster, England, have  
5 invented a new and useful Improvement in Screwing Appliances for Forming Screw-Threads on Bolts, &c., of which the following is a specification.

The principal object of my invention is to  
10 provide a ready adjustment to compensate for the wear of the dies or cutting-tools employed for the screwing of bolts or studs or other articles or objects of different diameters, for the formation of screws of any desired  
15 length and diameter and, whenever desirable, screws of different sizes on different parts of the articles operated upon, and for the easy release of said articles without unscrewing them from the dies.

20 A screwing appliance constructed according to my invention may be constructed with two or more dies or cutting-tools; but the invention is illustrated in the accompanying drawings by an appliance with three dies or  
25 cutting-tools.

Figure 1 represents a front elevation, Fig. 2 a side elevation, Fig. 3 a rear elevation, and Fig. 4 a longitudinal section on the plane indicated by the line 4 4 of Figs. 1 and 3, of  
30 the appliance having the cutting-dies in operative position. Fig. 5 is a front elevation corresponding with Figs. 1, 2, 3, and 4, but with part of the cover removed and part thereof shown in section. Fig. 6 is a side  
35 elevation of said appliance with the dies in position to allow an article or object to be withdrawn without being unscrewed from it. Fig. 7 is a side view of one of the dies. Figs. 8 and 9 are respectively a side view and a top  
40 view of one of the details of the appliance to be hereinafter described.

In the screwing appliance illustrated in the accompanying drawings, *a a a* are three dies or cutting-tools mounted in corresponding  
45 radial grooves or channels, which are formed to receive them in a block or holder *b*. As shown, the holder *b* is made with a central passage throughout its length, so that articles or objects being operated upon may pass  
50 therein without meeting with any obstruc-

tion to their continued passage. Each die *a* is formed at one end with teeth or cutting edges *a*<sup>3</sup>, adapted to form screw-threads of the required pitch and character. There is  
55 arranged in conjunction with each die a sliding piece *d*, with a projection *d'* engaging in a notch *d*<sup>\*</sup> (see Fig. 7) in such die and pressed upon by a spring *e*, bearing at one end against such sliding piece *d* and at the other end  
60 against the end of a hole or passage in the holder, lengthwise of which said sliding piece *d* is capable of being slid, said hole or passage being parallel to and in part in communication with the groove or channel in which  
65 said die *a* is mounted, said spring *e* tending to force such sliding piece *d*, and with it said die, away from the center line of the appliance.

The holder *b* is capable of being slid in the direction of the axis of the screwing appliance in a socket *c*, which may be of any suitable form, but as shown is in the form of a  
70 cylindrical tube. A groove is formed in the socket *c*, and a key *b'* to fit into said groove is placed in a recess in the stem *b*<sup>2</sup> of the holder *b*, so as to prevent the holder *b* and socket *c*  
75 from being turned in relation to each other, while permitting the holder *b* to be slid in the socket *c* in the direction of the axis of the screwing appliance. In order to limit the movement of the holder lengthwise of  
80 the socket *c*, a slot *c'* of suitable length, as is hereinafter further explained, is formed in the socket *c* and a stud *b*<sup>3</sup>, projecting into such slot *c'* and of a diameter approximately  
85 equal to the width of such slot, is screwed into the stem *b*<sup>2</sup> of the holder *b*. Surrounding the holder *b* and movable lengthwise of the stem *b*<sup>2</sup> thereof are rings *f g*. The ring *f* is made capable of being turned into and secured in  
90 different positions upon the ring *g*. In the example shown a curved slot *g'* is formed in the ring *g* and a stud *f'* is secured in the ring *f* and made to pass through the said slot *g'* and provided with a washer and a nut *f*<sup>2</sup>.  
95 In order to prevent the holder *b* and ring *g* and the ring *f* when secured to the ring *g* from being turned in relation to each other and in order to limit the movement of such rings *f g* in the direction of the axis or center  
100 line of the screwing appliance, as is herein-



after further described, a recess  $c^2$  of suitable length is formed in the socket  $c$  and a screw  $g^2$  of a diameter approximately equal to the width of the recess  $c^2$  is screwed into the ring  $g$ , so as to project into the recess  $c^2$ . The ring  $f$  and the dies  $a$  are arranged to so react upon each other that such ring  $f$  holds the dies  $a$  in operative position and is moved thereby in the direction opposite to that indicated by the arrow  $A$  in the direction of the axis of the appliance in the release of the articles or objects operated upon and when moved in the direction of the arrow  $A$  when the holder  $b$  is moved in the opposite direction serves to restore the dies  $a$  to working position. To render possible this action and reaction, each die  $a$  is formed at its outer end in part with a surface  $a'$  at right angles or approximately at right angles to its length and in part with a surface  $a^2$ , inclined to its length, and the ring  $f$  is formed internally with faces  $f^3$ , which when a screw-thread is being formed by the appliance form abutments or supports to prevent the dies from moving away from the bolt or article being operated upon. The internal faces  $f^3$  of the ring  $f$  are, as is clearly indicated in Fig. 5, formed at equal distances from the center line of the appliance and made of such form—spiral, for example—that by said ring being turned into a suitable position and then secured upon the ring  $g$  the dies  $a$  may when bearing against said internal faces  $f^3$  with their faces  $a'$  be in proper position to act in the manner requisite upon said bolt or article. A cover  $h$ , which may conveniently be formed of a front plate  $h^2$ , brazed into a tube  $h^3$ , is secured by means of three set-screws  $h'$  to the holder  $b$ , so as to keep the dies  $a$ , sliding pieces  $d$ , and springs  $e$  in position therein and to exclude dirt and particles of metal from the recesses and grooves in which the dies  $a$  and sliding pieces  $d$  and springs  $e$  are mounted and from the recesses between the ring  $f$  and holder  $b$ . The cover  $h$  and holder  $b$  are formed with channels  $l$  for the escape of the cuttings removed by the dies  $a$  from the bolt or article operated upon. The cover  $h$  is formed with a slot  $h^4$ , through which a key to turn the ring  $f$  in relation to the ring  $g$  may be passed into a hole  $f^4$ , formed to receive it in the ring  $f$ . On the cover  $h$ , as indicated in the section in Fig. 5, is formed a scale  $h^5$ , which, with the hole  $f^4$ , serves to indicate the relative positions of the rings  $f g$ .

The slot  $c'$  is made of such length that the holder  $b$  can be moved from the position in which it is indicated in Fig. 2 just so far that the faces  $a'$  of the dies are moved out of contact with the edges  $f^5$  of the internal faces  $f^3$ , respectively employed therewith, and the inclined faces  $a^2$  of such dies are just brought into contact with said edges  $f^5$ . The recess  $c^2$  is made of such length that after the holder  $b$  has been moved in the socket  $c$  in the direc-

tion indicated by the arrow  $A$  to the extent permitted by the stud  $b^3$  and slot  $c'$  the springs  $e$  may move the dies  $a$  outward away from the axis of the appliance far enough or, preferably, somewhat more than far enough to allow an article on which they may have formed screw-threads to be withdrawn without being unscrewed therefrom, but not so far as to take their inclined surfaces  $a^2$  out of contact with the edges  $f^5$  of the internal faces  $f^3$ , with which they respectively act.

The screwing appliance illustrated in the accompanying drawings is for use mounted in a machine—a lathe, for example—provided with any suitable device—for example, such as is used in turret-lathes—by which the movement of the screwing appliance toward the part carrying the article to be operated upon or of such article toward the screwing appliance or the mutual approach of the screwing appliance and such article shall be interrupted as soon as a screw-thread of the required length has been formed on said article, and before the screwing of an article is commenced the appliance is set in the position illustrated by Figs. 1, 2, 4, and 5. As soon as the relative movement of the screwing appliance and article ceases the dies  $a$  screw themselves for a very short time upon said article and carry with them the holder  $b$  as far as the slot  $c'$  and stud  $b^3$  permit and are then moved outward by the springs  $e$ , so as to become free of the screw-threads which they have formed and allow the article to be withdrawn from the screwing appliance without it being necessary to stop or reverse the rotation of the screwing appliance or article, whichever may be revolving. The outward movement of the dies  $a$  by means of the inclined faces  $a^2$  moves the rings  $f g$  upon the socket  $c$  in a direction opposite to that indicated by the arrow  $A$  to the extent permitted by the recess  $c^2$  and stud  $g^2$ . In order to again set the screwing appliance to form screw-threads, the attendant in charge of the machine in which such appliance is employed simply presses the rings  $f g$  in the direction indicated by the arrow  $A$  and the cover  $h$  in the opposite direction, and thereby causes the edges  $f^5$  of the internal faces  $f^3$  of the ring  $f$  to force the dies  $a$  inward toward the center line of the appliance and into engagement with the said faces  $f^3$ .

The ring  $f$  affords a firm and solid abutment to the dies  $a$  when forming screw-threads and holding them in proper position assures the accurate formation of screw-threads, and the dies  $a$ , being moved in straight lines in relation to the articles operated upon in releasing them, are prevented from causing injury to them. The dies  $a$ , used in screwing-heads made according to my invention, being simple in form, are easily made from steel bars and can be readily hardened without being liable to distortion.



Screwing appliances constructed according to my invention may either be held stationary or be caused to revolve while in use, being capable of being made free from all projections upon their outer circular or cylindrical surfaces, and such appliances are also efficient and convenient in operation, simple in construction, and cheap to maintain in working condition and readily adjustable to compensate for the wear of the dies or the recutting thereof.

What I claim as my invention is—

1. In an appliance for forming screw-threads, the combination of dies formed with cutting edges upon their ends which are directed toward the center line of the appliance and with reacting parts at their other ends, a holder with grooves in which said dies are movable in the directions of their lengths and furnished with a cover bearing upon said dies and holding them in said grooves and so making them movable by said holder to and fro in the direction of the center line of the appliance, springs to bear against said holder and press said dies outwardly therein, a socket longitudinally in which said holder is movable, means for limiting the movement of said holder in said socket and preventing it from being turned therein, two rings capable of being moved longitudinally of said socket and one of which is mounted upon the other and capable of being turned into and secured in different positions thereon and surrounds said dies and is furnished with approximately spiral faces to bear against the reacting faces of said dies, and means for limiting the movement of said rings upon said socket for preventing them from being turned upon said socket, all substantially as hereinbefore described.

2. In an appliance for forming screw-threads, the combination of dies formed with cutting edges upon their ends which are directed toward the center line of the appliance and with reacting parts at their other ends, a holder with grooves in which said dies are movable in the directions of their lengths and furnished with a cover bearing upon said dies and holding them in said grooves and so making them movable by said holder to and fro in the direction of the center line of the appliance, springs to bear against said holder and press said dies outwardly therein, a socket longitudinally in which said holder is movable, a stud in said holder engaging with a slot in said socket to limit the longitudinal movement of said holder in said socket, a key in said holder engaging with a groove in said socket to prevent said holder from being turned in said socket, two rings capable of being moved longitudinally of said socket and one of which is mounted upon the other and capable of being turned into and secured in different positions thereon and surrounds said dies and is furnished with approximately

spiral faces to bear against the reacting faces of said dies, and a pin in one of said rings engaging with a groove in said socket for limiting the movement of said rings upon said socket and for preventing them from being turned upon said socket, all substantially as hereinbefore described.

3. In an appliance for forming screw-threads, the combination of dies formed with cutting edges upon their ends which are directed toward the center line of the appliance and with reacting parts at their other ends, a holder with grooves in which said dies are movable in the directions of their lengths and furnished with a cover bearing upon said dies and holding them in said grooves and so making them movable by said holder to and fro in the direction of the center line of the appliance, sliding pieces mounted in said holder to slide inward and outward therein and furnished with projections engaging with notches in said dies, springs between said holder and said sliding pieces for pressing said sliding pieces and thereby said dies outwardly in said holder, a socket longitudinally in which said holder is movable, means for limiting the movement of said holder in said socket and preventing it from being turned therein, two rings capable of being moved longitudinally of said socket and one of which is mounted upon the other and capable of being turned into and secured in different positions thereon and surrounds said dies and is furnished with approximately spiral faces to bear against the reacting faces of said dies, and means for limiting the longitudinal movement of said rings upon said socket and for preventing them from being turned upon said socket, all substantially as hereinbefore described.

4. In an appliance for forming screw-threads, the combination of dies formed with cutting edges upon their ends which are directed toward the center line of the appliance and with reacting parts at their other ends, a holder with grooves in which said dies are movable in the directions of their lengths and furnished with a cover bearing upon said dies and holding them in said grooves and so making them movable by said holder to and fro in the direction of the center line of the appliance, sliding pieces mounted in said holder to slide inward and outward therein and furnished with projections engaging with notches in said dies, springs between said holder and said sliding pieces for pressing said sliding pieces and thereby said dies outwardly in said holder, a socket longitudinally in which said holder is movable, a stud in said holder engaging with a slot in said socket for limiting the longitudinal movement of said holder in said socket, a key in said holder engaging with a groove in said socket to prevent said holder from being turned in said socket, two rings capable of being moved lon-



gitudinally of said socket and one of which is  
mounted upon the other and capable of being  
turned into and secured in different positions  
thereon and surrounds said dies and is fur-  
5 nished with approximately spiral faces to  
bear against the reacting parts of said dies,  
and a pin in one of said rings engaging with  
a groove in said socket for limiting the move-

ment of said rings upon said socket and for  
preventing them from being turned upon 10  
said socket, all substantially as hereinbefore  
described.

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