

L. F. HART.
SCREW CUTTING DEVICE.
APPLICATION FILED FEB. 17, 1908.

925,100.

Patented June 15, 1909.

4 SHEETS—SHEET 1.

Fig. 1

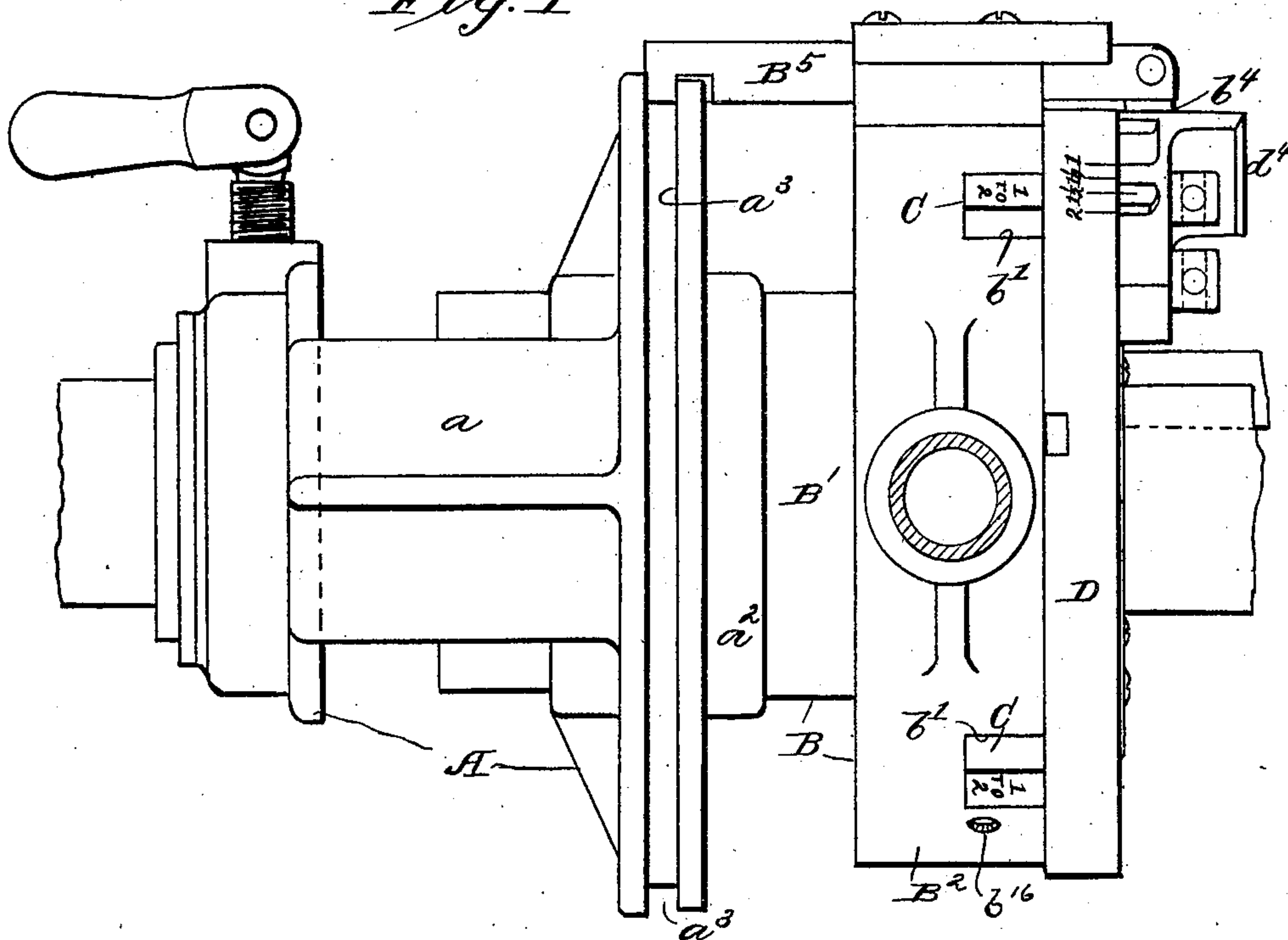
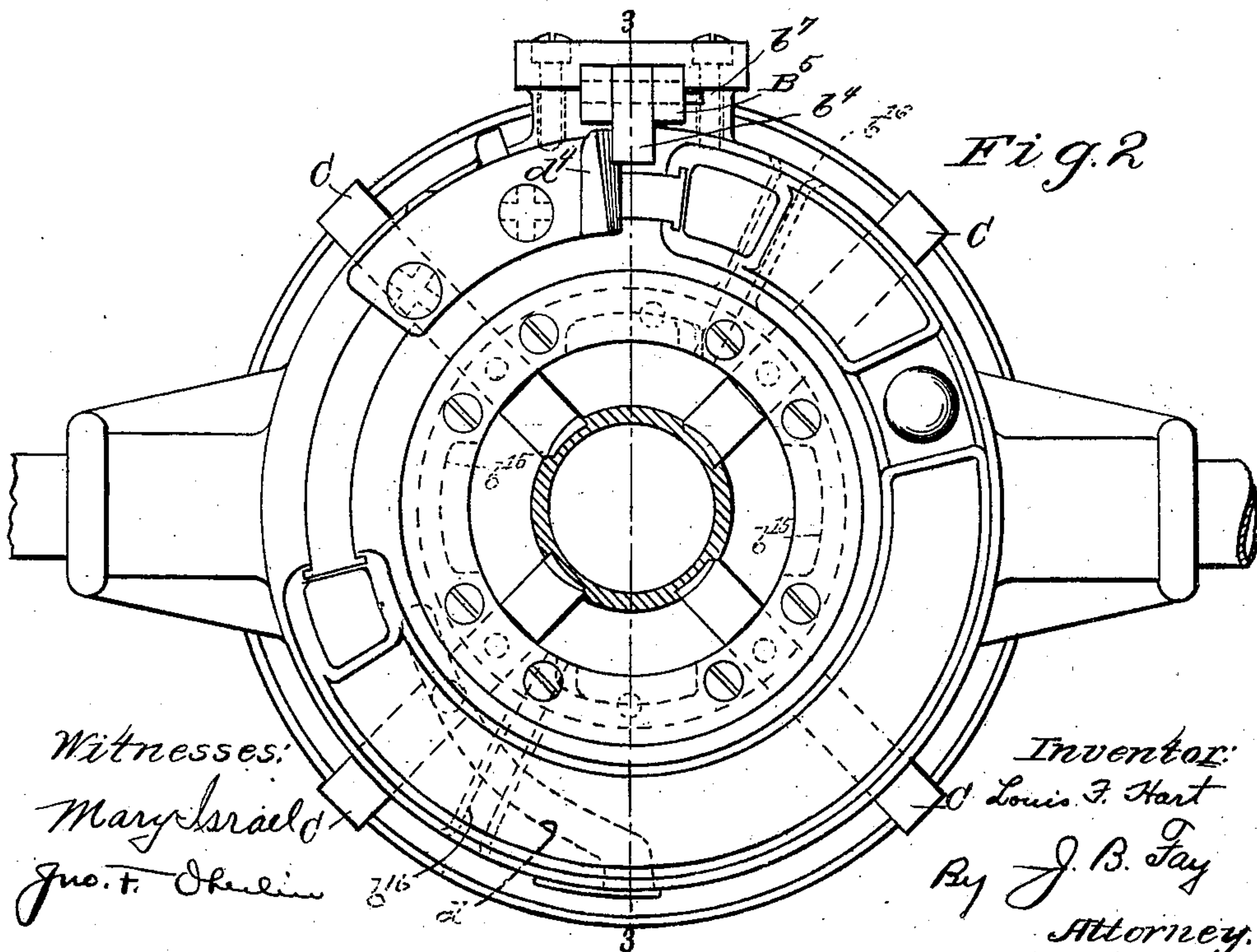


Fig. 2



Witnesses:
Mary Israel
Geo. F. Oberlin

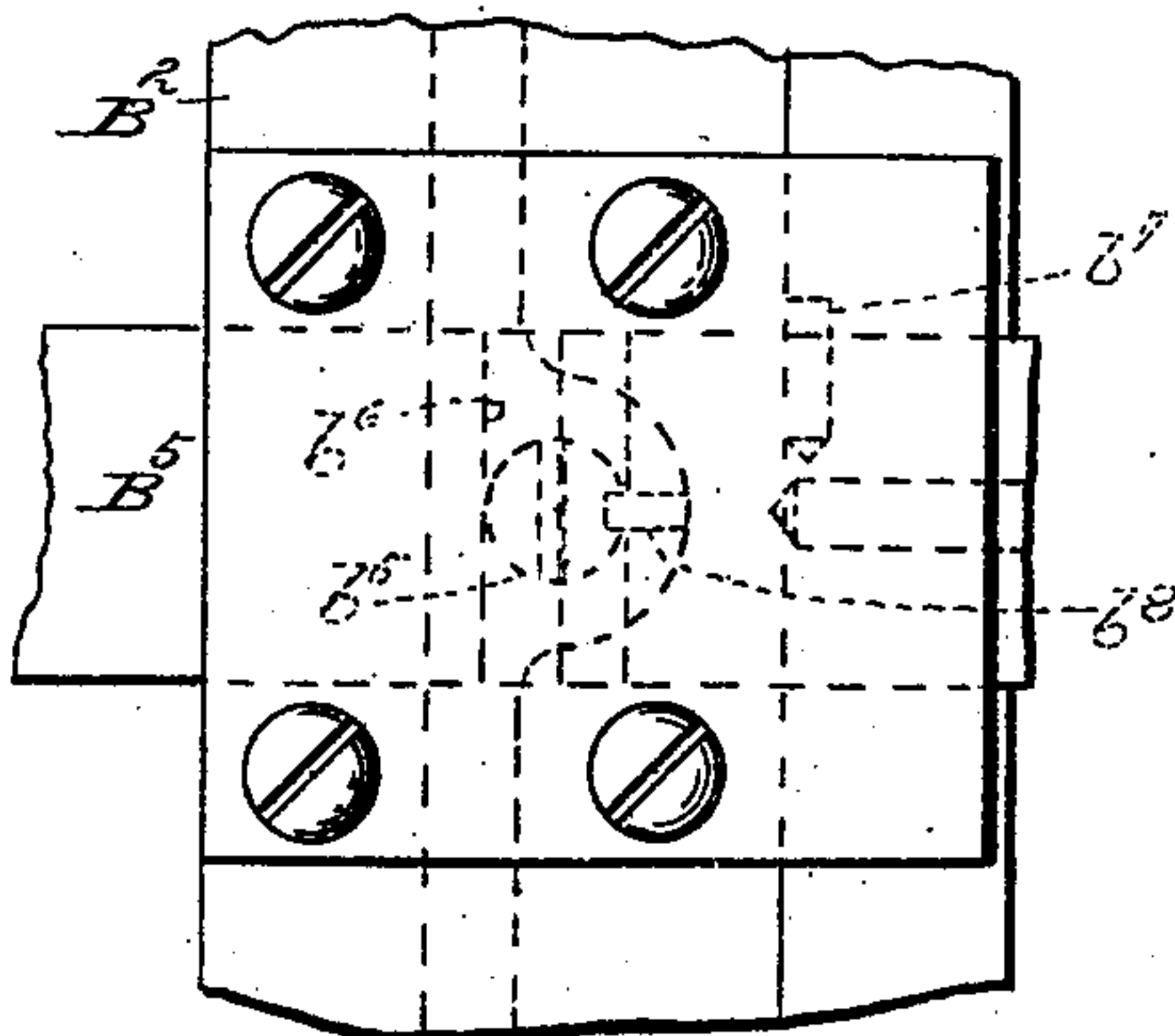
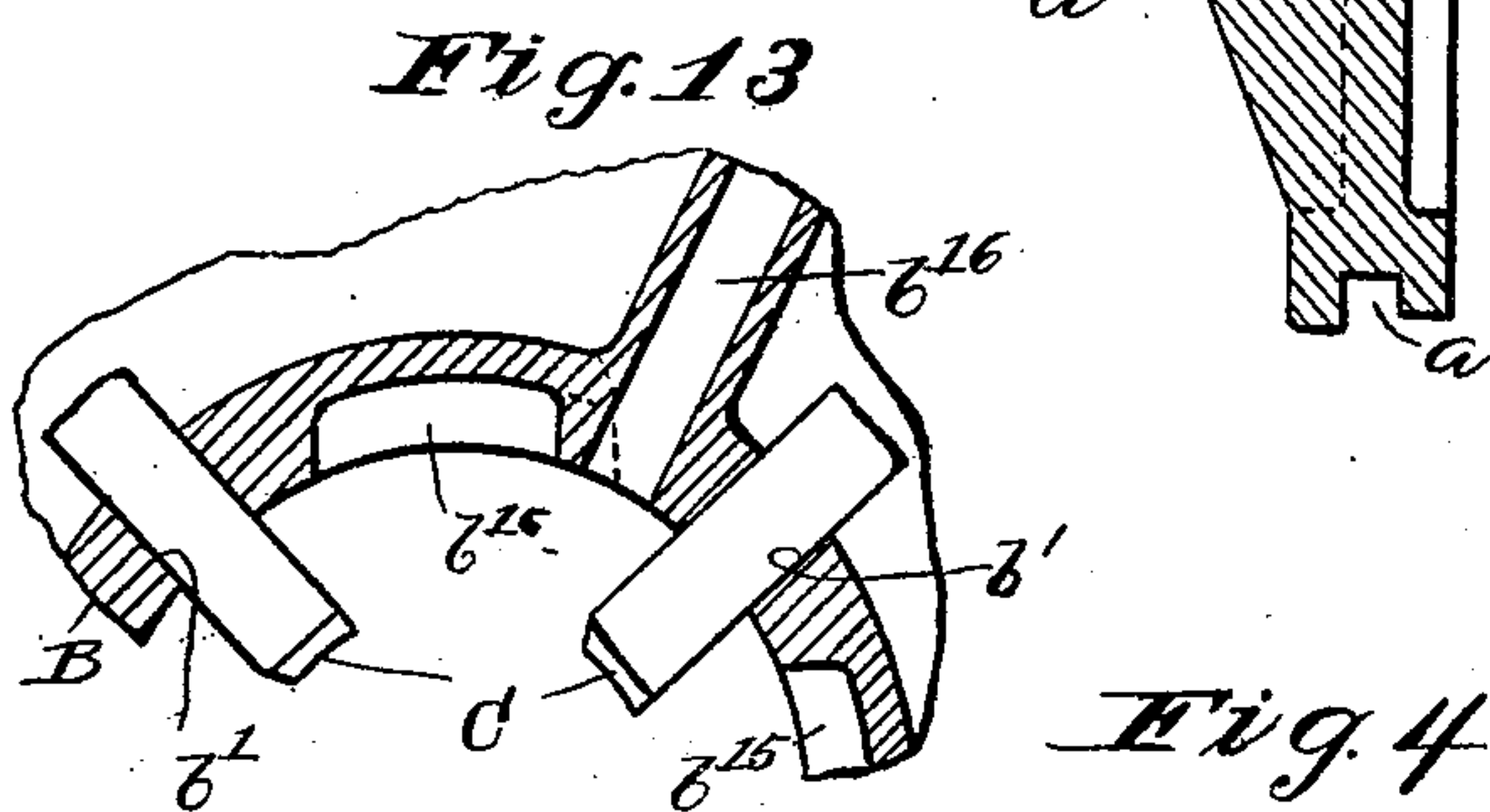
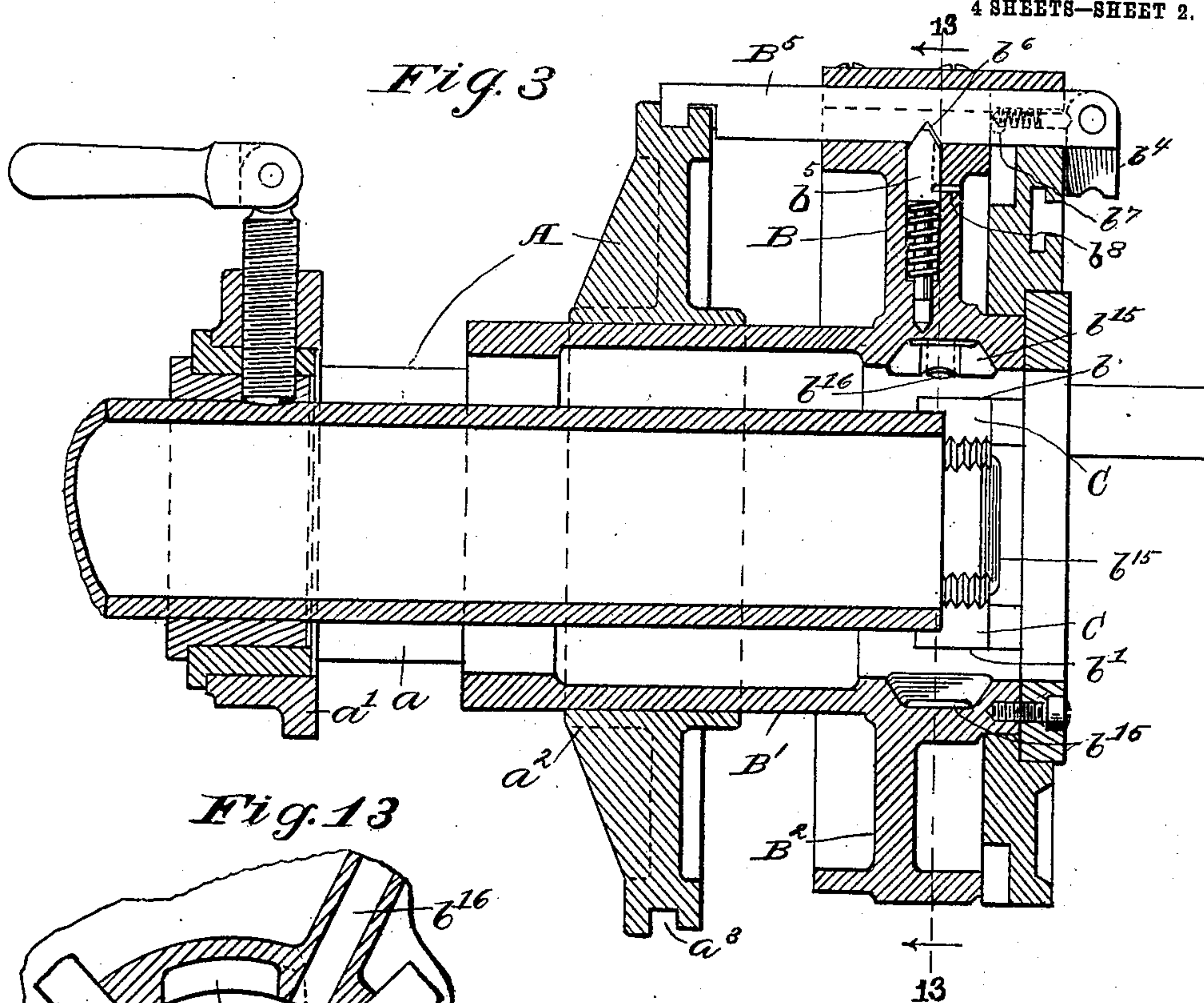
Inventor:
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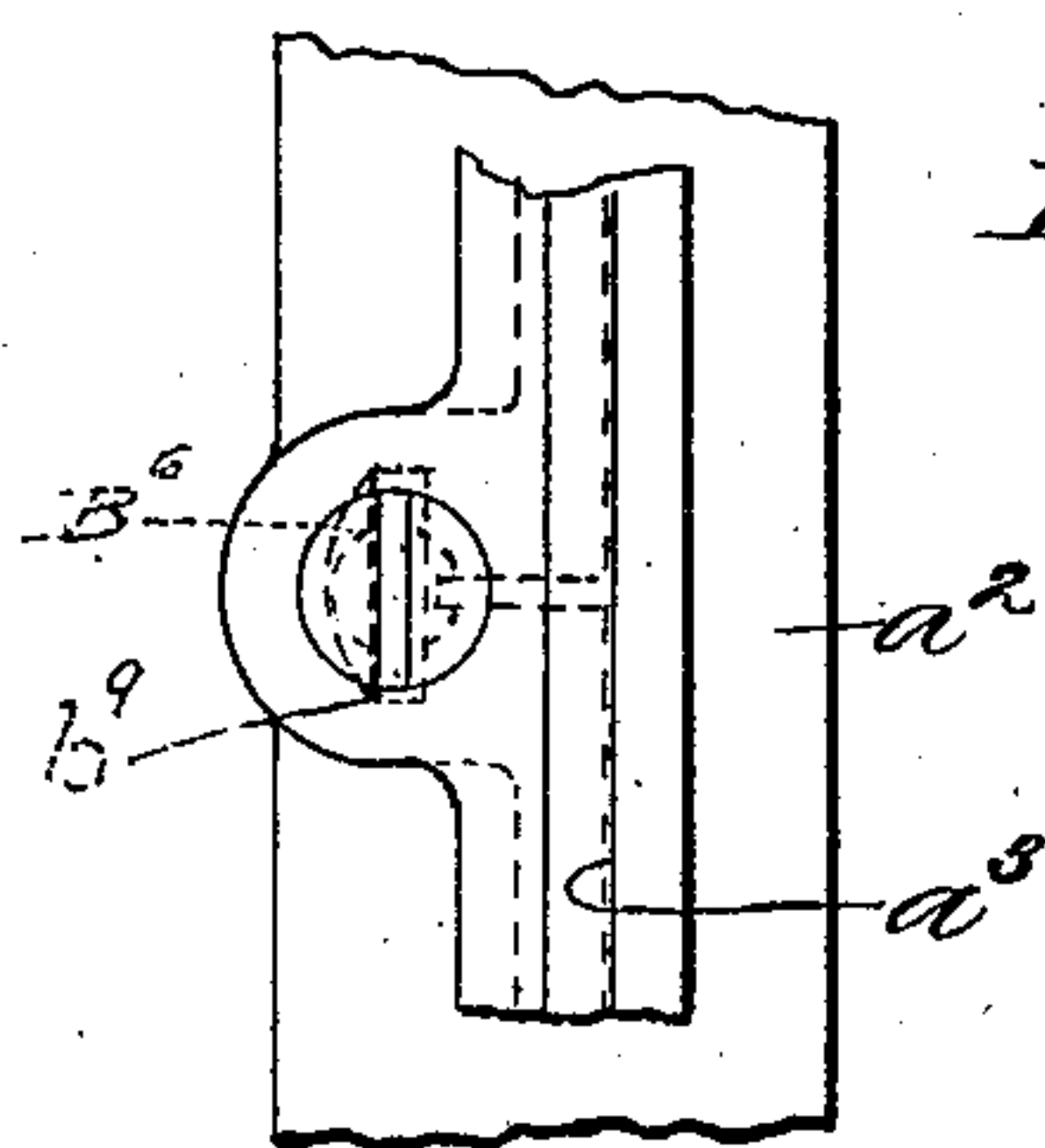
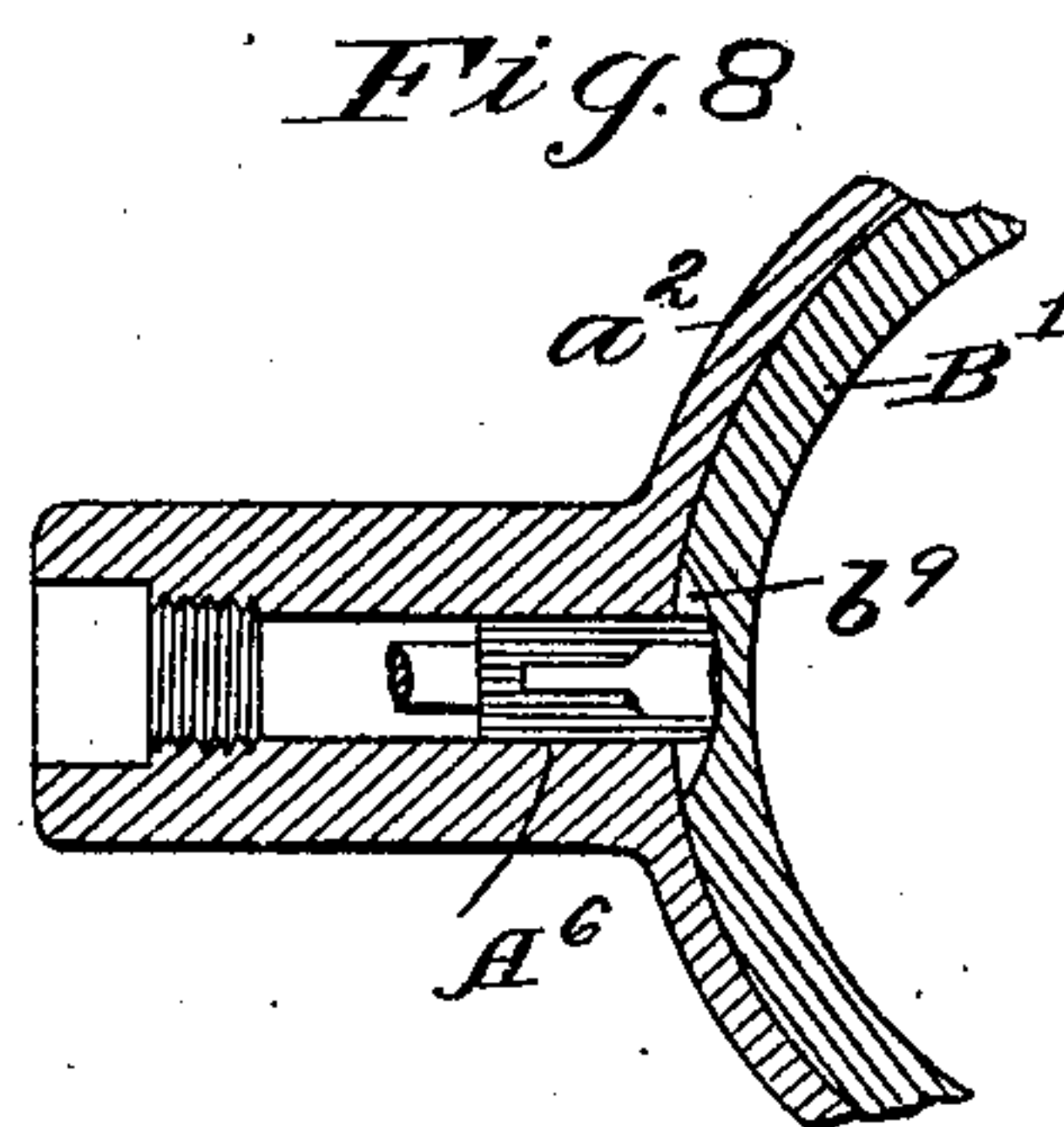
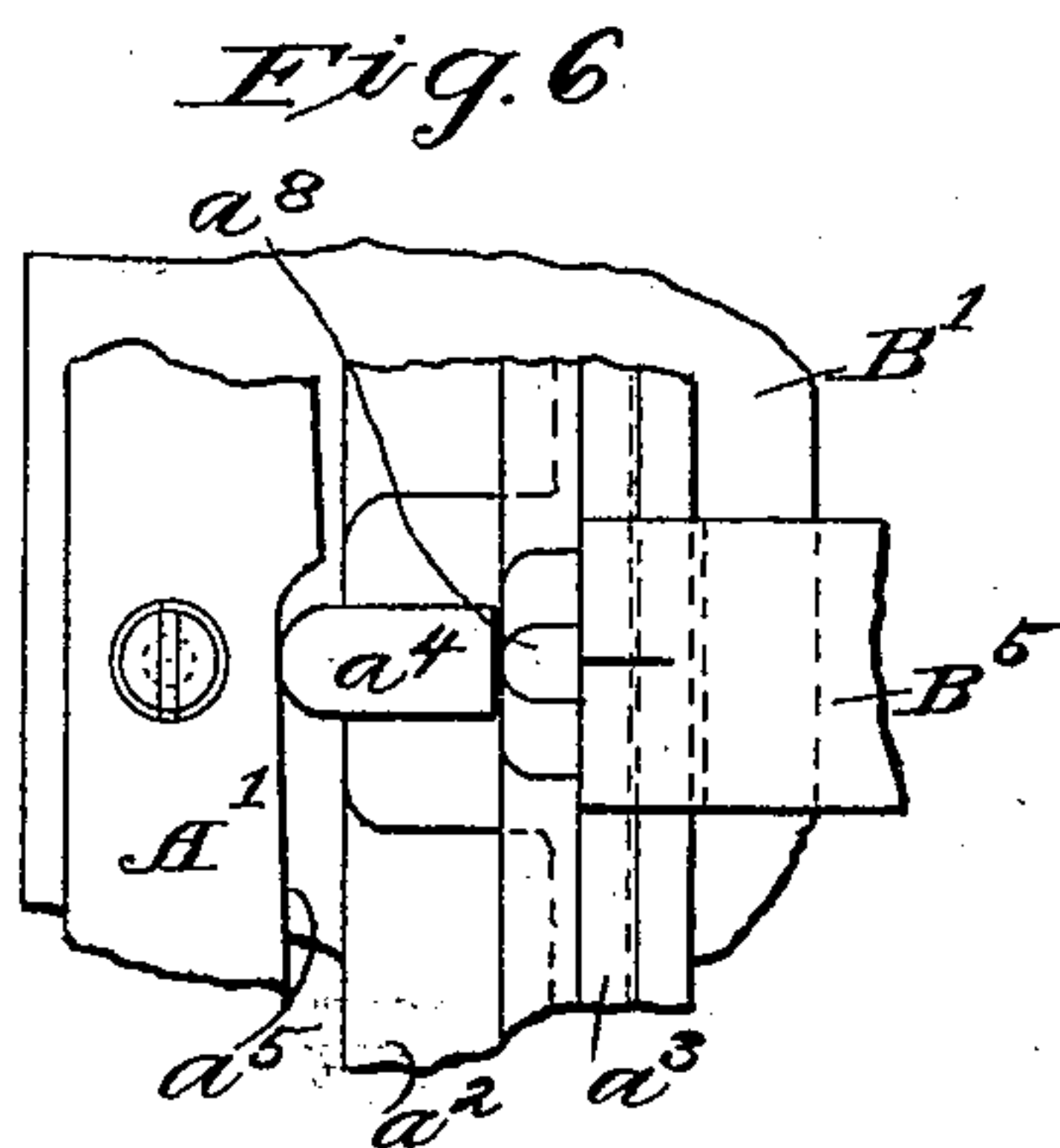
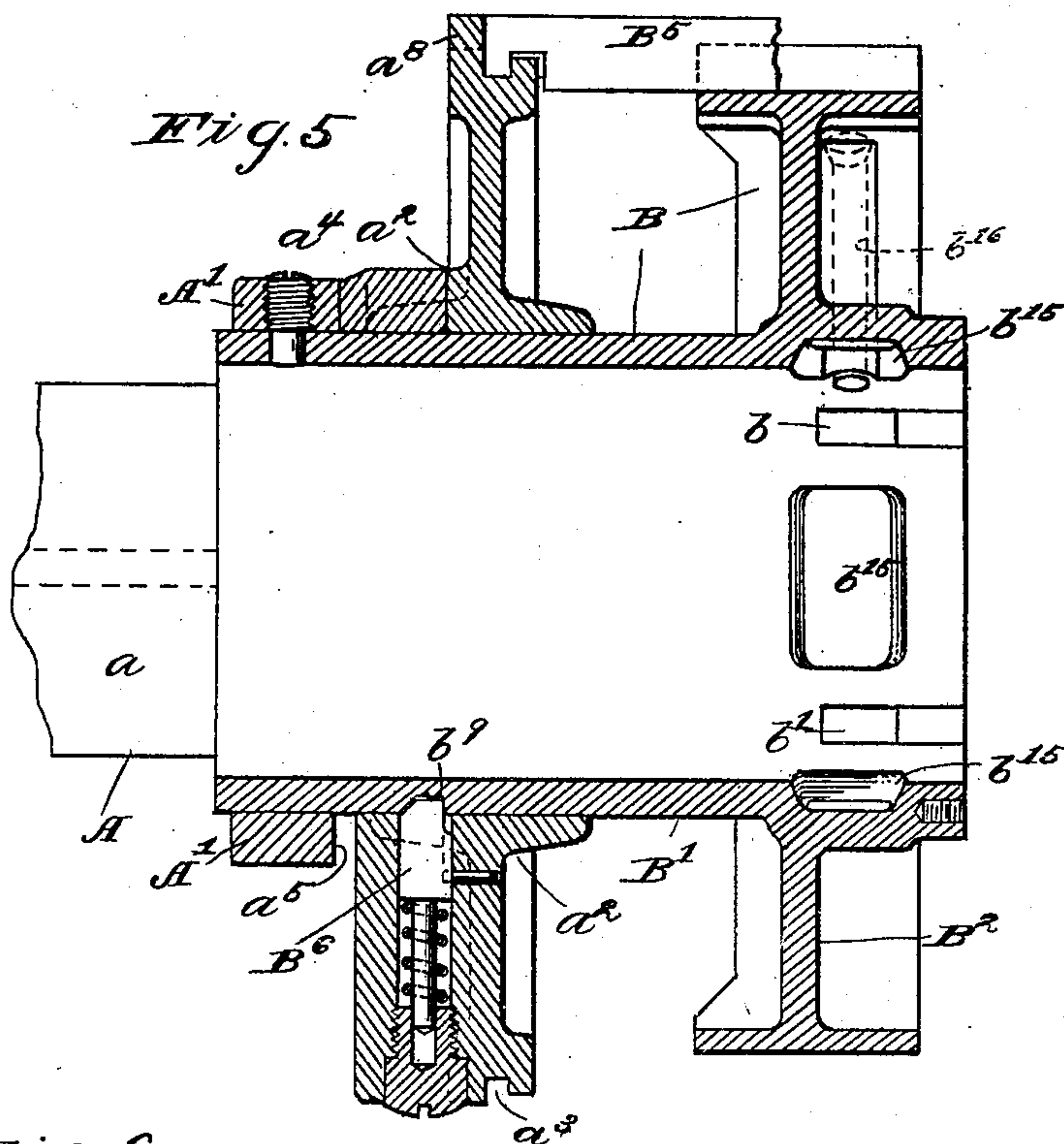
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Witnesses:
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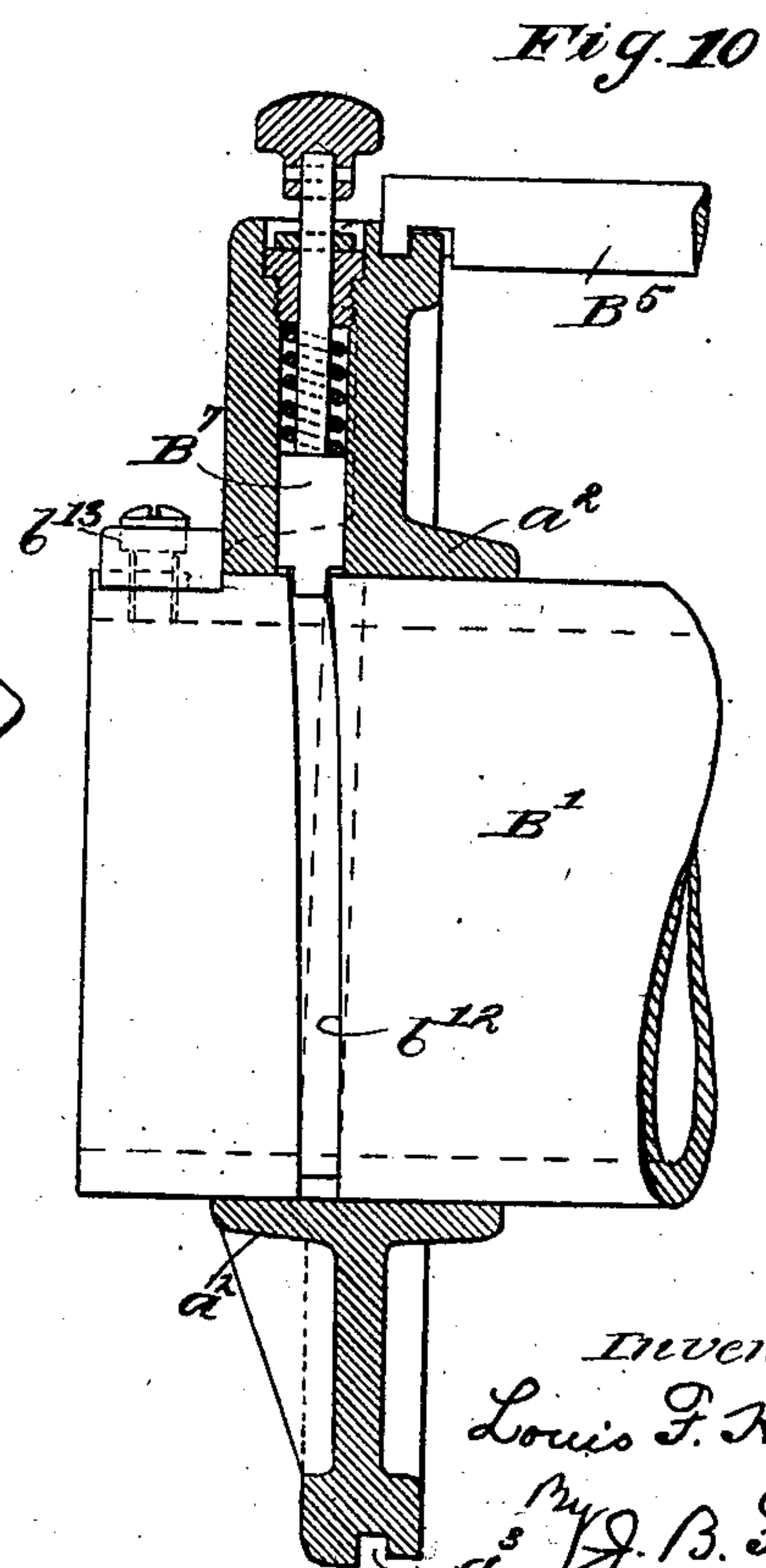
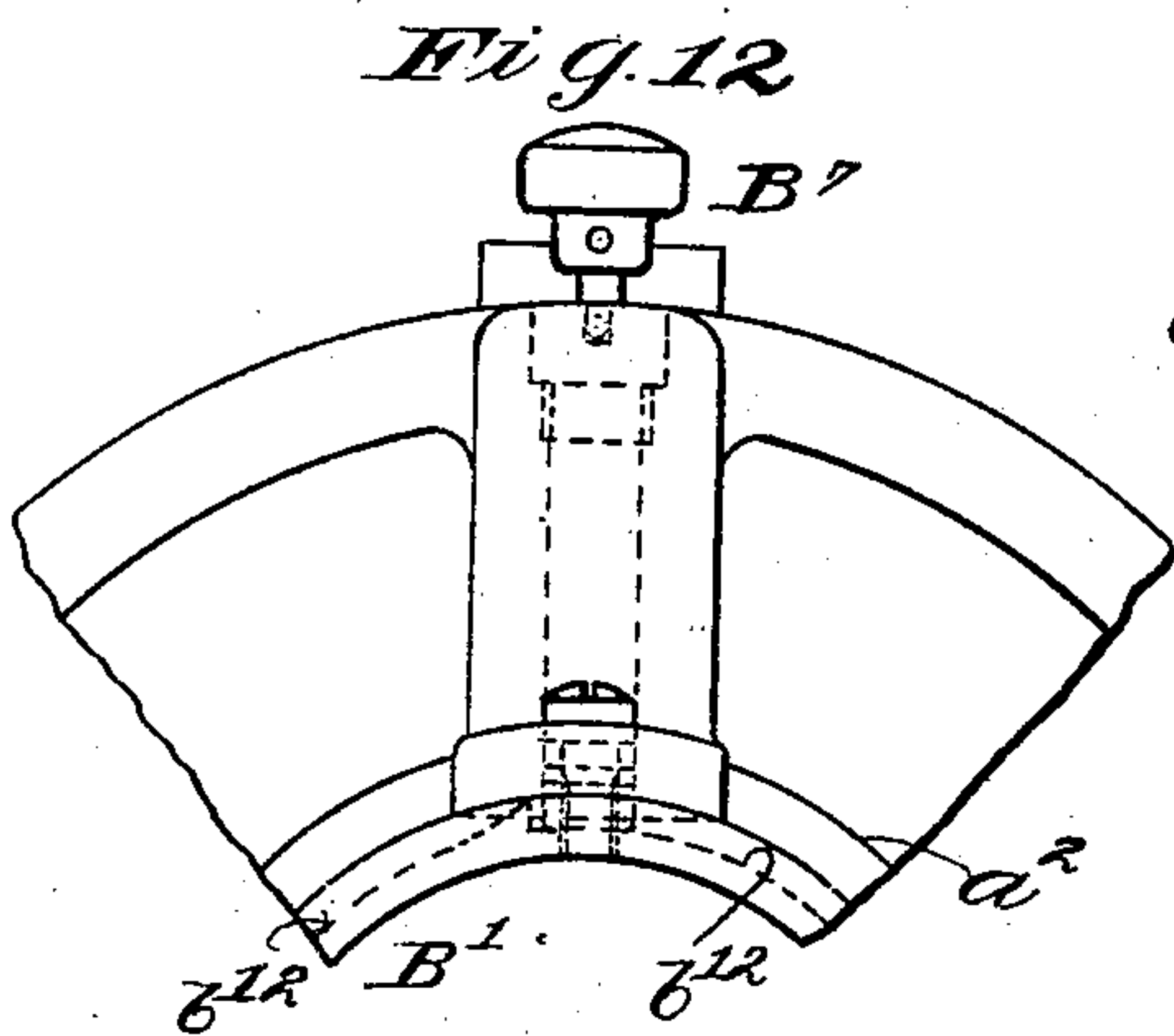
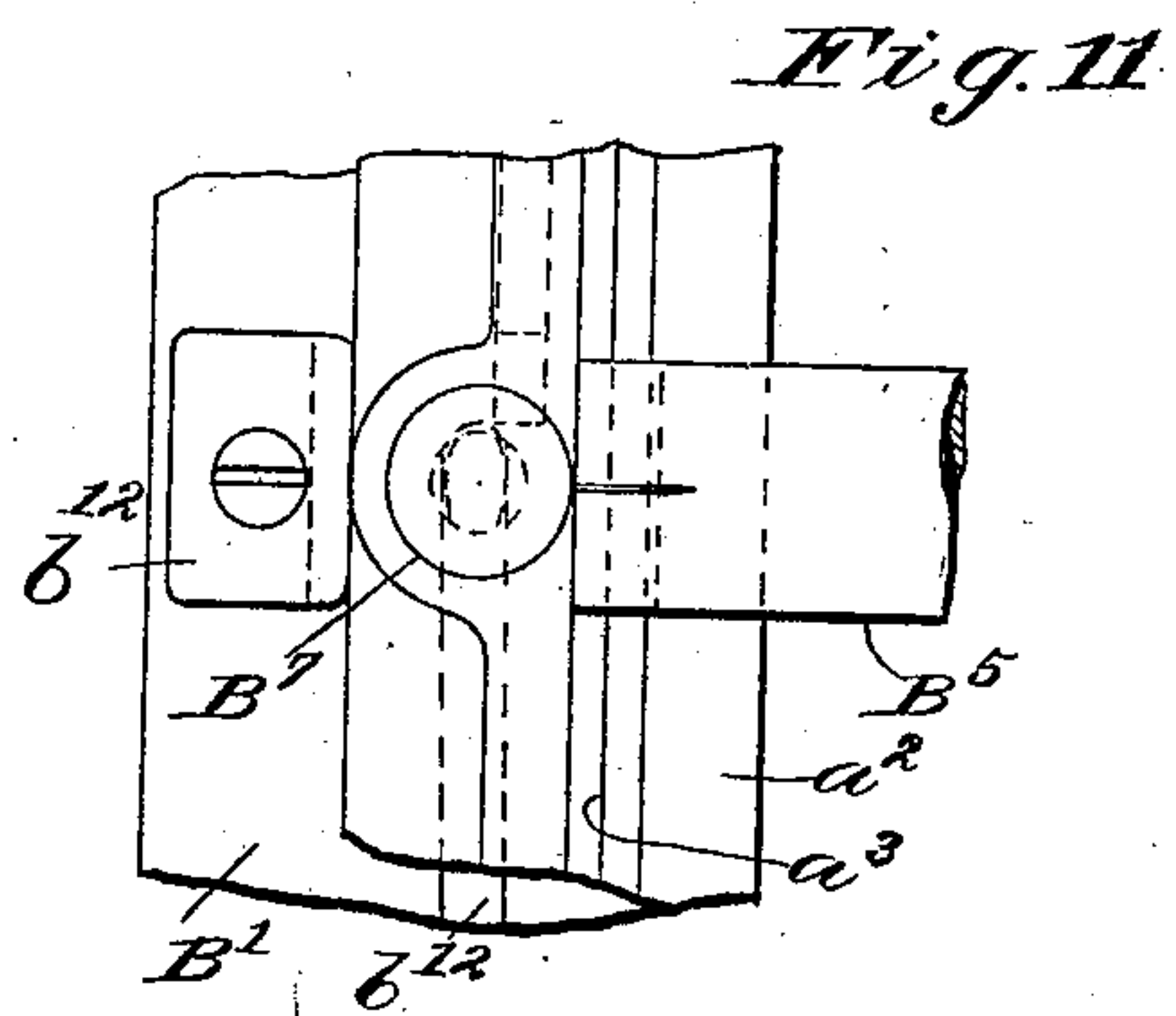
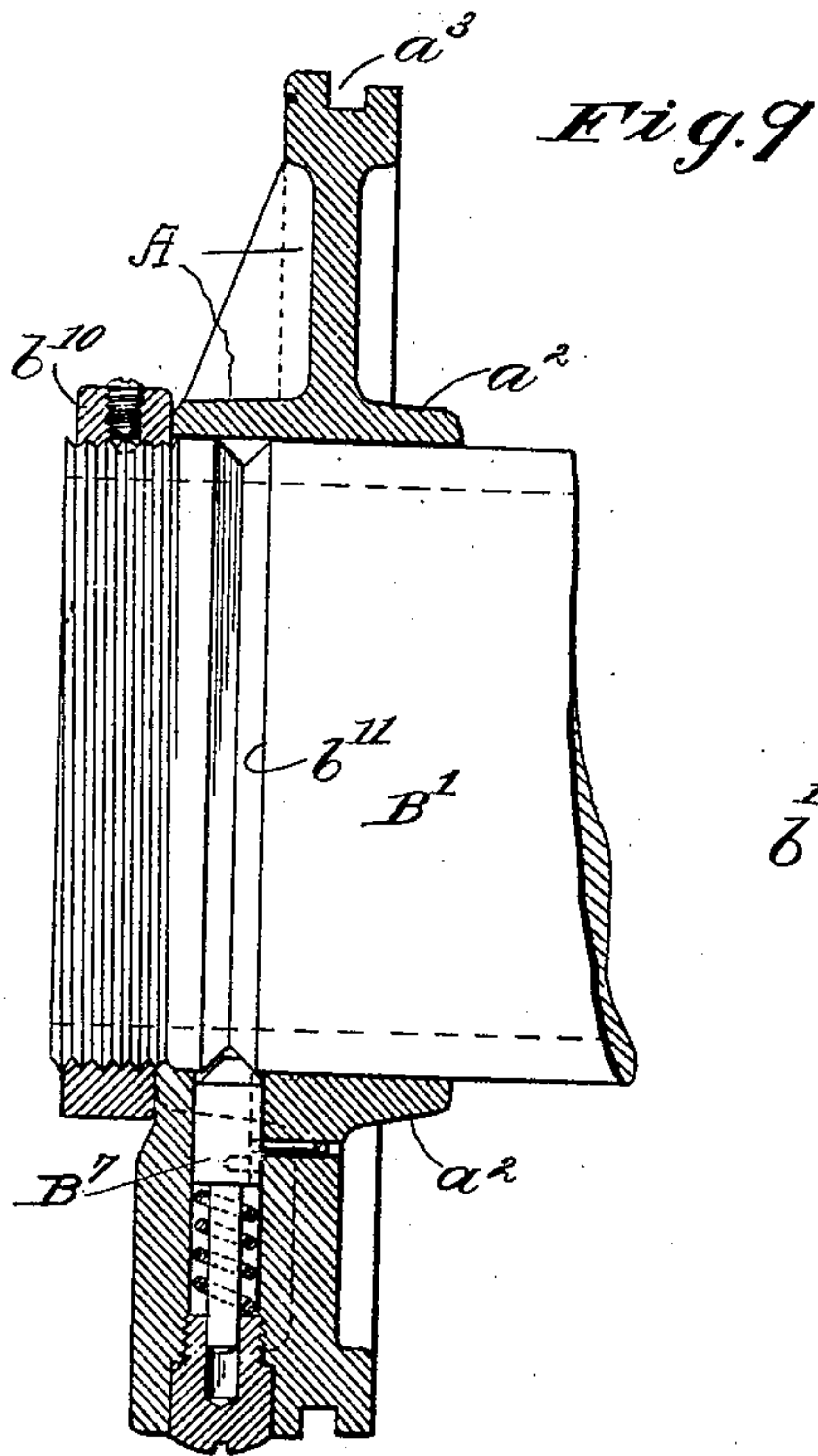
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4 SHEETS—SHEET 4.



Witnesses:
Mary Israel
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Inventor:
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UNITED STATES PATENT OFFICE.

LOUIS F. HART, OF CLEVELAND, OHIO, ASSIGNOR TO THE HART MANUFACTURING COMPANY,
OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

SCREW-CUTTING DEVICE.

No. 925,100.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed February 17, 1908. Serial No. 416,229.

To all whom it may concern:

Be it known that I, LOUIS F. HART, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Screw-Cutting Devices, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relating as indicated to devices for cutting threads has more particular regard to devices of this character adapted for the cutting of tapered threads such as it is generally desirable to have in threading pipes or the like where it is essential that a tight fitting joint be secured.

The general type of screw cutting device to which the present invention belongs, forms the subject-matter of a co-pending application, Serial No. 307,598, filed March 23, 1906, such type being characterized by the provision of automatically operating means for producing such tapered threads.

The present invention is directed more specifically to certain details of improvement in an adaptation of the general form of device above described, which adaptation likewise forms the subject-matter of a co-pending application, Serial No. 403,712, filed November 25, 1907. These improvements include means for more or less accurately locating the die-holding member in the work-holding member preparatory to starting to cut a thread, one specific form of such means being illustrated in the last of the above named applications. These improvements further include, in connection with one such form of locating means, a novel form of mechanism for starting the dies onto the work once they are thus properly located.

The above means, together with other related features constituting the present invention, will be hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 is a side elevation and Fig. 2 a front elevation of a die stock embodying certain of the im-

proved features of construction constituting the present invention; Fig. 3 is a central longitudinal cross-section of the same; Fig. 4 is a broken plan view of such die stock; Fig. 5 is a sectional view, similar to that of Fig. 3, showing a modification in the construction of the locating means; Fig. 6 is a top plan view of the device illustrated in Fig. 5; Fig. 7 is a bottom plan view of the same illustrating particularly the locating means; Fig. 8 is a sectional view of such last named means; Fig. 9 is a view similar to Figs. 3 and 5 illustrating yet a third form of locating device; Fig. 10 similarly illustrates a fourth form of locating device together with a modified form of leading means to which reference has been made above; Fig. 11 is a plan view of the structure illustrated in Fig. 10; Fig. 12 is a rear elevation of the same; and Fig. 13 is a transverse cross-section on the line 13—13 Figs. 3 and 5, showing oil pockets for assisting in the lubrication of the dies when the tool is in use.

The general features of construction of the tool illustrated in variously modified form in the figures just described need be here but briefly noted. Such tool, specifically a die stock, will be seen, Figs. 1 and 2, to be made up of two main members, a stock holding frame A and a die holding member, or head, B revolvably mounted in said frame. Member A may be regarded as being made up of two concentric but axially separated annular portions a' a^2 joined together by longitudinally disposed connecting portions a . Annular portion a' of the frame is designed to serve as a work-holding device, being secured to the work in the usual fashion. Annular portion a^2 of frame A has its inner face finished to form a bearing for the die-holding member B, which latter in approved construction comprises a sleeve portion B' , adapted to be thus journaled within portion a^2 of the frame, and a flange portion B^2 in which the chaser dies C are designed to be supported. To rotate member B in frame A the former is provided with two radially extending arms or handles of the usual type.

For the reception of the dies a plurality of preferably radially disposed slots b' are cut in the face of flange portion B^2 of member B, the dies being adjustably positioned in such slots by means of a cam plate D rotatably mounted on the face of the flange B^2 . The conformation of the grooves d in the cam plate that engage with the dies, is such that

the outward pressure of the latter is adapted to rotate the plate. Such rotation is controlled by slidably mounting in the flange B^2 of die-holding member B a rider bar B^5 , the rear end of which engages a slot or recess a^3 encircling annular portion a^2 of frame A, the front end of which extends a short distance in front of the cam plate in question. By virtue of the engagement of the rear end of the rider bar with frame A in the manner described, such bar is obviously retained against longitudinal movement relatively to the frame while still being allowed to rotate freely along with member B. The front end of the bar is provided with a dog b^4 that in its normal position is adapted to engage a stop d^4 adjustably mounted on the face of the cam plate and by virtue of such engagement to control the rotation of the cam plate. The contacting faces of the dog and stop are so formed that, as the die-holding member B moves longitudinally within the work-holding member A, a slight rotation of the cam plate is permitted, thereby allowing the dies to expand and to cut a tapered thread.

The forward end of the sleeve portion B' of member B is recessed on its inner surface intermediately between the slots b' that receive the dies C so as to form a plurality of disconnected but alined pockets b^{15} , Figs. 3, 9, and 13. These pockets serve to gather the oil, for the admission of which holes b^{16} are provided, and to pour it over the dies in succession as the head B is revolved. In order that the oil may not escape by the holes b^{16} , through which it is thus fed as required to the work, such holes open interiorly in the finished face of the sleeve and not directly in the pockets in question. By means of the pockets not only is the oil conserved, and the amount required thus lessened, but such lubricant is applied exactly when most needed.

It will be appreciated that in a device of the character described, in which the use of the troublesome leader screw has been abolished, that some means should be provided for locating the head or die holding member in proper position within the work-holding member for the commencement of the cutting operation and to retain the same in such position during the ordinary handling of the tool and while it is being secured to the work. As has been indicated in connection with the description of the drawings, several specific forms of means for the accomplishment of this result have been devised by me. One such form I have already illustrated in the above identified co-pending application, such means consisting of a spring-pressed plunger adapted to engage the rear face of a leader ring that is employed in the particular tool forming the subject-matter of such application to assist the dies in initially gripping the work. The front or cam face of the leader ring in question being formed with an offset,

the proper location of the members of the die-stock is secured by drawing them apart until the plunger thus engages with the rear face of the ring and then rotating them until the pin that bears against the cam face comes in contact with the offset thereon, thus sensibly indicating to the operator that the parts of the device are in proper place.

In the specific modification of this feature of locating means illustrated in Figs. 3 and 5, I employ a spring-pressed plunger b^5 in conjunction with the rider bar B^5 instead of with the leader ring, the latter being entirely omitted in the structure under consideration and hand pressure relied upon to effect proper starting of the dies. The plunger b^5 is conveniently mounted in the flange portion B^2 of die-holding member so as to be adapted to engage a transverse recess or groove b^6 formed in the under surface of the rider bar. This groove being of V-shape and the plunger of corresponding cross section, it will be evident that the parts will be only loosely held in the desired relative positions so that upon the actual threading operation being undertaken, the travel of the rider bar in the die-holding member will not be seriously impeded, the plunger being merely forced out of the way. In addition to plunger b^5 which thus merely resiliently engages the rider bar, I employ a pin b^7 on one side of the bar that is adapted to contact with the flange B^2 and afford positive means for limiting the relative longitudinal movement of members A and B. Plunger b^5 is secured against rotation by a pin b^8 as will be readily understood, and its beveled end is flattened as shown in Fig. 3. The groove b^6 is furthermore so located with reference to the plunger that the latter does not exactly aline therewith but exerts pressure against its inner side thereby taking up any play between the parts.

In the form of locating means illustrated in Figs. 6, 7 and 8, a spring-pressed plunger B^6 is mounted in annular portion a^2 of the work-holding member, just as in the device illustrated in my co-pending application. Here, however, instead of engaging with the leader ring A' in order to hold the parts loosely in their proper initial position, a gash or recess b^9 is provided in the sleeve portion of member B. The two members are accordingly merely drawn longitudinally apart until a lug a^4 projecting rearwardly from portion a^2 contacts with the cam-face a^5 of the leader ring whereupon by rotating member B within member A, the plunger will snap into place. The axial location of the recess or gash b^9 is so determined that this engagement takes place when the lug a^4 lies in the deepest portion, or at the starting point, of the cam a^5 . The transverse conformation of the gash is such that, as will be obvious from an inspection of the figures

named, disengagement of the plunger can be had only upon rotation of the parts such as will be incident to the operation of the tool. The under face of the plunger is preferably
 5 concave to correspond with the curvature of sleeve B', the edges being a trifle rounded so as to prevent its catching in the gash.

In the device as illustrated in Fig. 9, use of a cam ring is again omitted, a retaining
 10 collar b^{10} , threaded upon the rear end of sleeve portion of member B, taking its place. The locating means here comprise a plunger B' of a form similar to that last considered and an encircling groove b^{11} , instead of a simple
 15 gash, in the sleeve wherewith said plunger is adapted to have engagement. By giving such groove a cam conformation, it may be made to function doubly, both as a locating device as has been described in connection with the last-described form of my
 20 tool, and as a leading device. This form of construction is the one illustrated in Figs. 9, 10 and 11, where the groove b^{12} will be seen to have an advance or lead in the course
 25 of its single turn about the sleeve, substantially equivalent to that of the cam-face of leader ring A' in the form of device shown in Figs. 6, 7, and 8. The rear end of this groove terminates abruptly so as to afford
 30 a stop adapted to limit the movement of the plunger in that direction; while the forward end of such groove is formed with an incline adapted to permit the plunger to rise up onto the outer cylindrical surface of the
 35 sleeve. In this form of the tool the retaining ring or collar b^{10} of Fig. 9 is shown as being replaced by a lug or block b^{13} secured on the rear end of sleeve B'.

Specific claims to the construction of locating means shown in Figs. 6 to 8, inclusive
 40 and in Figs. 9 to 11, inclusive, respectively, have been required to be divided out of the present case and so appear in a co-pending application, Serial No. 492,622, filed April
 45 28, 1909.

Whenever a leader ring, or its equivalent, is employed, a visual guide to assist in the determination of the proper axial position of the die-holding member within the work-
 50 holding member is desirable. In the device illustrated in Figs. 6, 7 and 8, such a guide is conveniently had in the form of a boss a^8 on the top of annular frame portion a^2 with which the rear end of rider bar B⁵ is
 55 designed to aline when the parts are properly positioned for beginning work. In the case of the device illustrated in Figs. 10, 11 and 12, the plunger B' serves, in place of the boss a^8 , thus to assist in locating the die-
 60 holding member.

That the use of terms in the claims, which follow generically drawn to the locating means, may not be misunderstood it should be stated that for the purpose of simplifying
 65 the statement of the invention the rider bar,

unless expressly introduced, is to be considered as a part of the work-holding member.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as re-
 70 gards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and dis-
 75 tinctly claim as my invention:—

1. In a screw cutting device, the combination with a work-holding member and a die-holding member longitudinally slidable and rotatably movable therein, of means borne
 80 by said members, respectively, and adapted to engage with each other and thereby sensibly indicate to the operator the proper starting position of the second member in the first.
 85

2. In a screw-cutting device, the combination with a work-holding member and a die-holding member longitudinally slidable and rotatably movable therein, of means adapted to locate the latter in the former in proper
 90 position for starting and to detachably secure the same in such position.

3. In a screw-cutting device, the combination with a work-holding member and a die-holding member longitudinally slidable and
 95 rotatably movable therein, of resilient means borne by one of said members and adapted, when said members are relatively located in proper position for starting, to engage the other member, said means and the part of
 100 said member coöperative therewith being arranged and constructed to be disengaged only upon relative rotative movement of said members.

4. In a screw-cutting device, the combination
 105 with a work-holding member and a die-holding member longitudinally slidable and rotatably movable therein, of resilient means borne by one of said members and adapted, when said members are relatively located in
 110 proper position for starting, to engage the other member, said means and the part of said member coöperative therewith being arranged and constructed to be disengaged only upon relative rotative movement of said
 115 members in a predetermined direction.

5. In a screw-cutting device, the combination with a work-holding member and a die-holding member longitudinally slidable and
 120 rotatably movable therein, of a spring-pressed plunger borne by one of said members, the other member being provided with means adapted to be engaged by said plunger when said members are relatively located in proper position for starting.
 125

6. In a screw-cutting device, the combination with a work-holding member and a die-holding member longitudinally slidable and
 130 rotatably movable therein, of a spring-pressed plunger borne by one of said mem-

bers, the other member being formed with a recess adapted to be engaged by said plunger when said members are relatively located in proper position for starting, such recess having its walls conformed to permit disengagement of said plunger only upon relative rotational movement of said members.

7. In a screw-cutting device, the combination with a work-holding member and a die-holding member longitudinally slidable and rotatively movable therein, of a spring-pressed plunger borne by one of said members, the other member being formed with a recess adapted to be engaged by said plunger when said members are relatively located in proper position for starting, such recess having its walls conformed to permit disengagement of said plunger only upon relative movement of said members in a predetermined direction.

8. In a screw-cutting device, the combination of a work-holding member, a die-holding member longitudinally slidable and rotatably movable therein, an element rotatably movable but longitudinally fixed relatively to said first-named member and connected to the die-holding member to rotate therewith, but permit relative longitudinal movement thereof, and means adapted to detachably secure said element to said last-named member in proper position for starting.

9. In a screw-cutting device, the combination of a work-holding member, a die-holding member longitudinally slidable and rotatably movable therein, a bar rotatably movable, but longitudinally fixed, to said first member and longitudinally movable in said second member, said bar having a recess, and a spring-pressed plunger in said second member adapted to engage such recess when said member is properly located in said first member for starting.

10. In a screw-cutting device, the combination of a work-holding member, a die-holding member, longitudinally slidable and rotatably movable therein, chaser dies movably mounted in said second member, a cam-plate rotatably secured to said second member and adapted to engage and position said dies, a bar rotatably movable, but longitudinally fixed, to said first member and longitudinally movable in said second member, said bar engaging with, and thereby controlling the rotation of, said cam-plate, and means adapted to detachably secure said bar to said second member when said members are relatively located in proper position for starting.

11. In a screw-cutting device, the combination of a work-holding member, a die-holding member longitudinally slidable and rotatably movable therein, chaser dies movably mounted in said second member, a cam-plate rotatably secured to said second member and

adapted to engage and position said dies, a bar rotatably movable, but longitudinally fixed, to said first member and longitudinally movable in said second member, said bar engaging with, and thereby controlling the rotation of, said cam-plate and bearing a transverse groove on its under side, and a spring-pressed plunger mounted in said second member and adapted to engage such groove when said members are relatively located in proper position for starting.

12. In a screw-cutting device, the combination of a work-holding member, a die-holding member longitudinally slidable and rotatably movable therein, an element rotatably movable but longitudinally fixed relatively to said first-named member, means adapted to limit movement of said element relatively to said last-named member, and means adapted to detachably secure said element to said last-named member in proper position for starting.

13. In a screw-cutting device, the combination of a work-holding member, a die-holding member longitudinally slidable and rotatably movable therein, chaser dies movably mounted in said second member, a cam-plate rotatably secured to said second member and adapted to engage and position said dies, a bar rotatably movable, but longitudinally fixed, to said first member and longitudinally movable in said second member, said bar engaging with, and thereby controlling the rotation of, said cam-plate, a pin borne by said bar and adapted to engage said second member to limit movement of said bar relatively thereto, and means adapted to loosely secure said bar to said second member when said members are relatively located in proper position for starting.

14. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, leader means adapted, upon rotation of said second member, to produce a limited longitudinal movement thereof, and elements borne by said members respectively and adapted to visually indicate by their relative positions when said second member is axially located within the first member in proper position with respect to said leader means for starting.

15. In a screw-cutting device, the combination of a work-holding member, a die-holding member independently longitudinally and rotatably mounted therein, a cam-plate rotatably secured to said second member and adapted to engage and position said dies, a bar rotatably movable, but longitudinally fixed, to said first member, and longitudinally movable in said second member, said bar controlling the rotation of said cam-plate, leader means adapted, upon rotation of said second member, to produce a limited longitu-

dinal movement thereof, and a boss borne by
said first member and so disposed as to indi-
cate, by alinement with the rear end of said
bar, when said second member is axially lo-
5 cated within the first member in proper posi-
tion with respect to said leader means for
starting.

Signed by me, this 13th day of February,
1908.

LOUIS F. HART.

Attested by—

E. R. RODD,
JNO. F. OBERLIN.