

No. 629,814.

Patented Aug. 1, 1899.

W. W. PHILBRICK.

MATCHER HEAD.

(Application filed Feb. 20, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

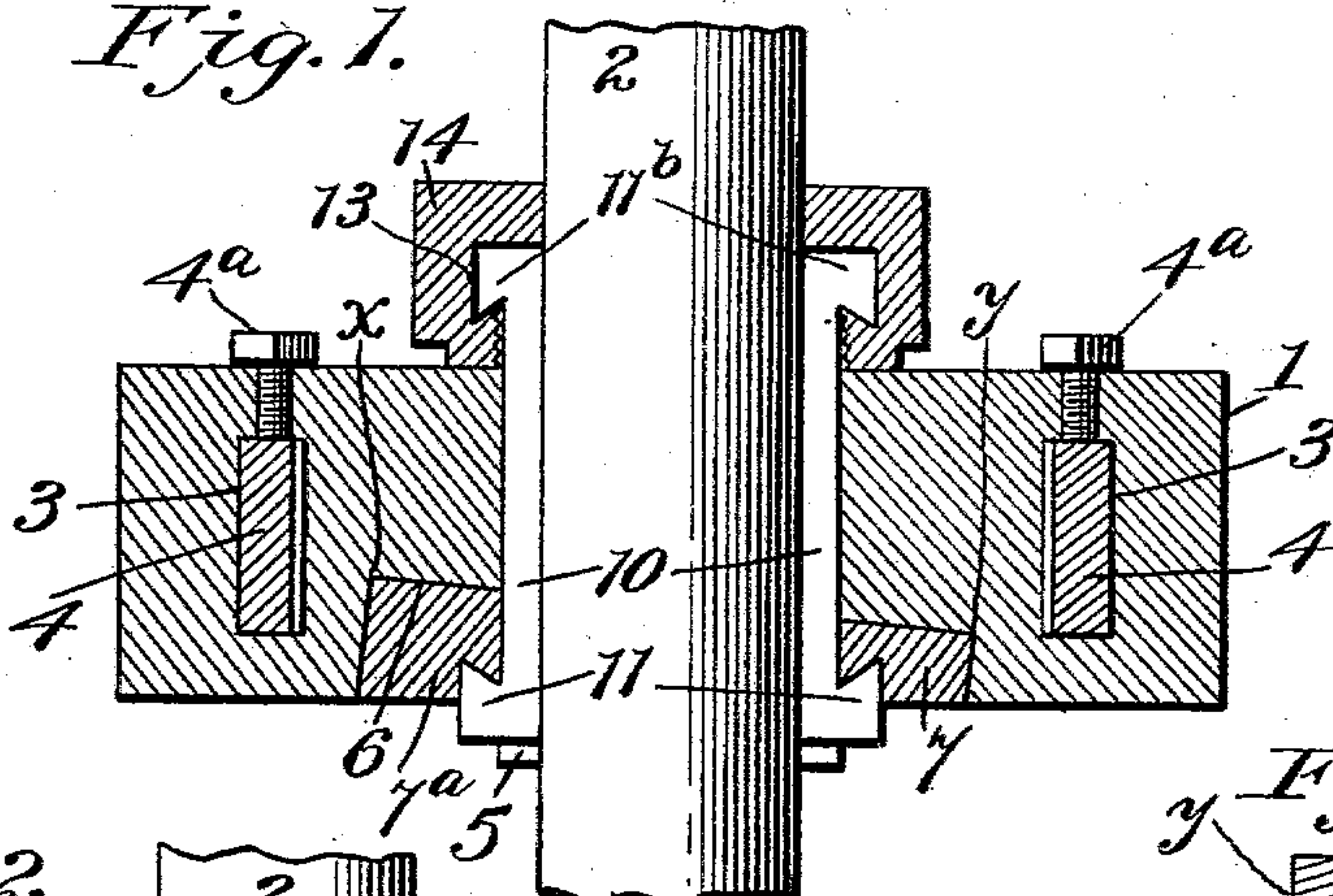


Fig. 2.

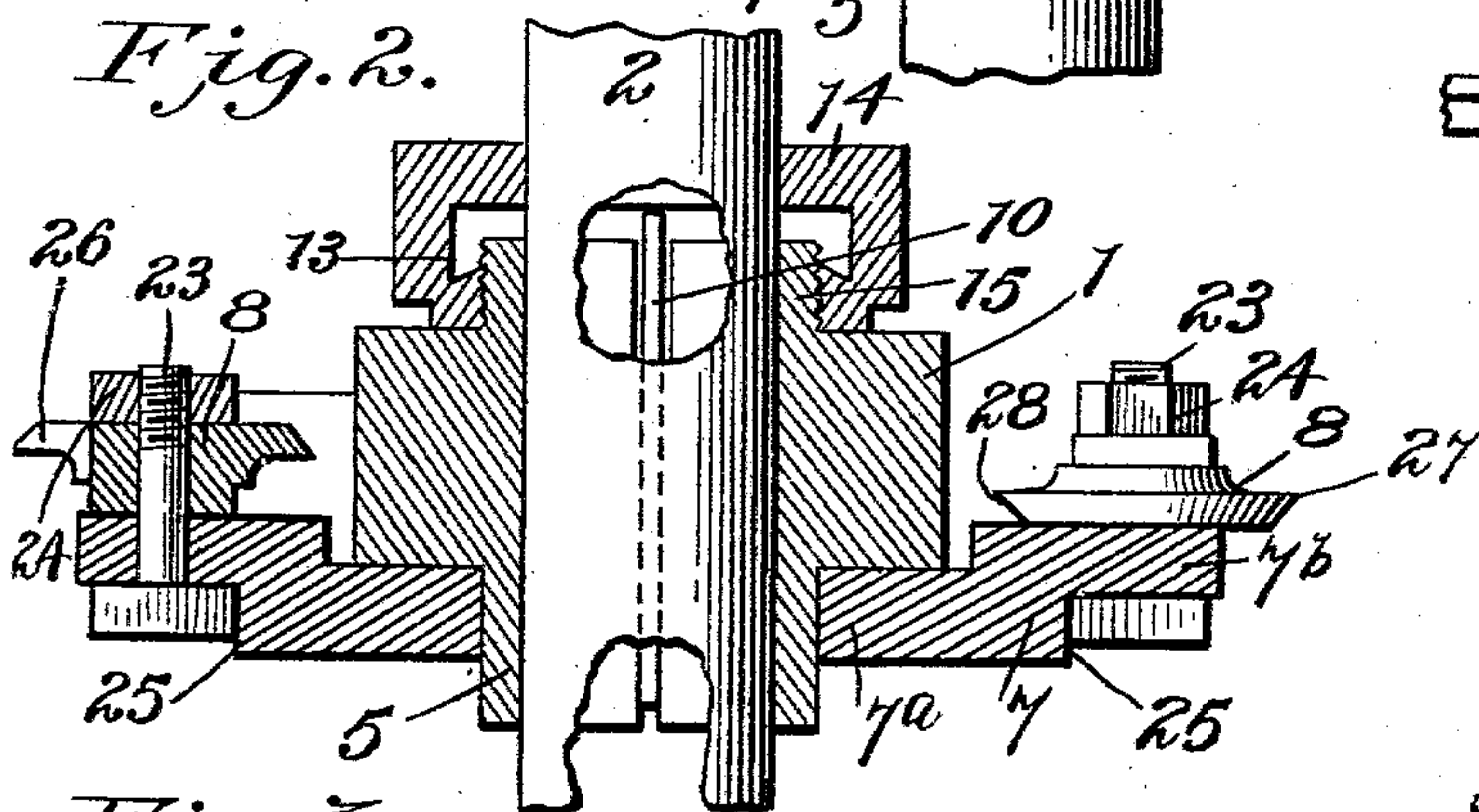
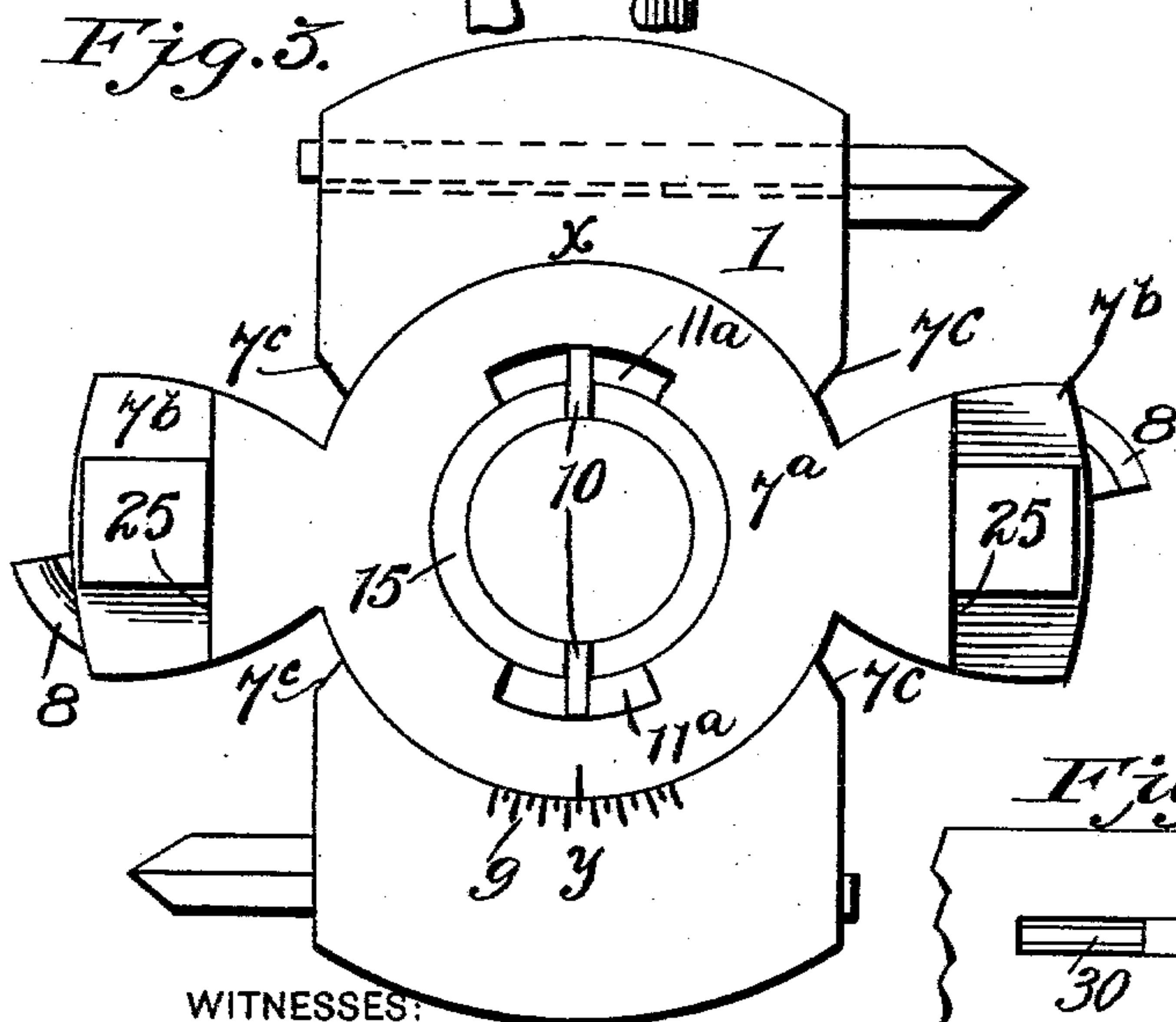


Fig. 3.



WITNESSES:

Edwin G. McKee.
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Fig. 11.

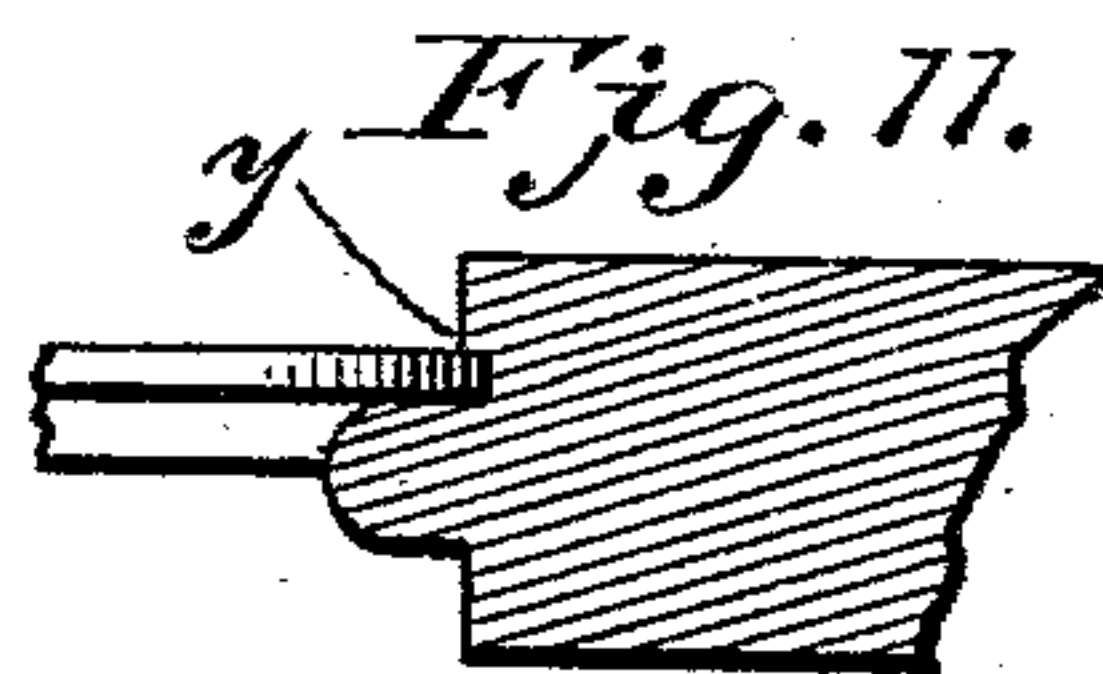


Fig. 12.

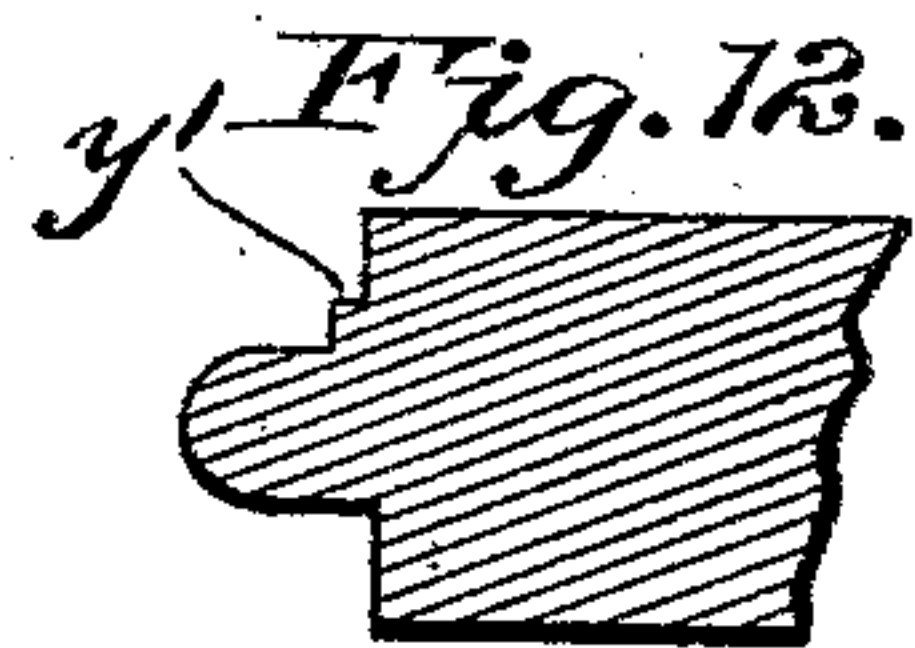


Fig. 13.

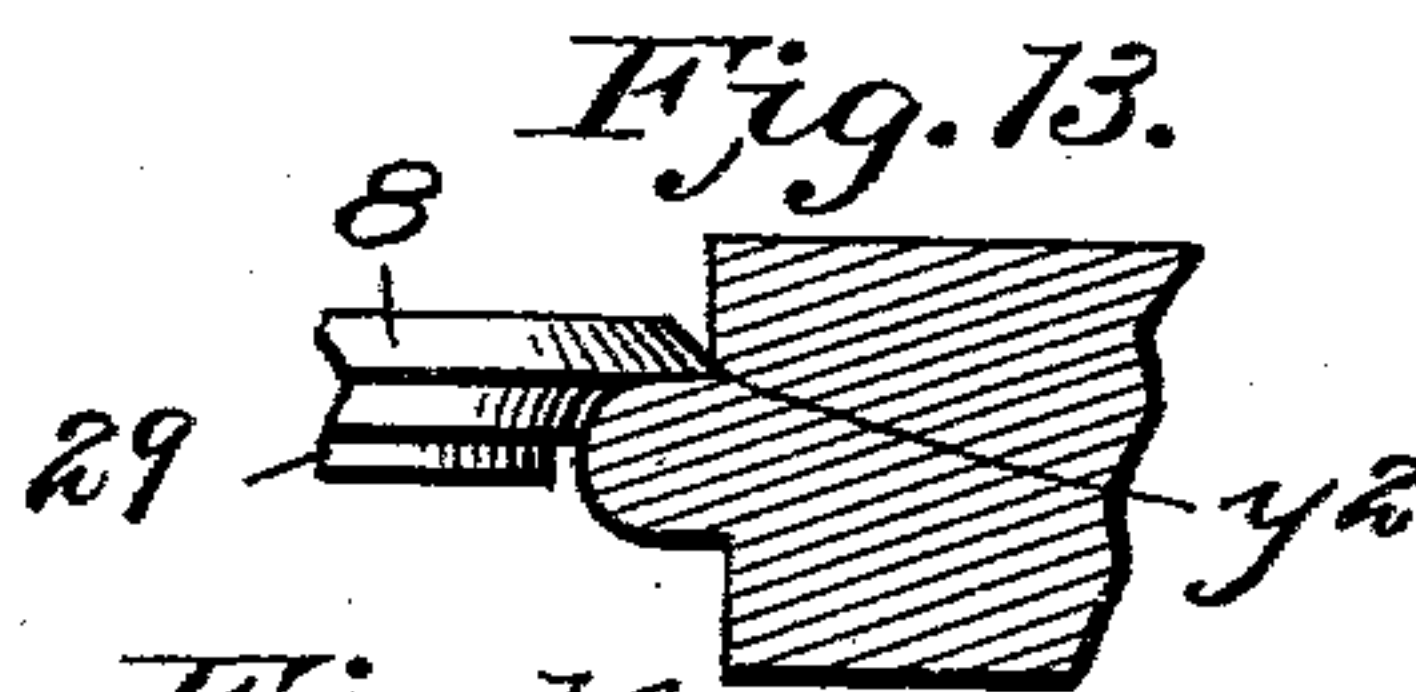


Fig. 14.

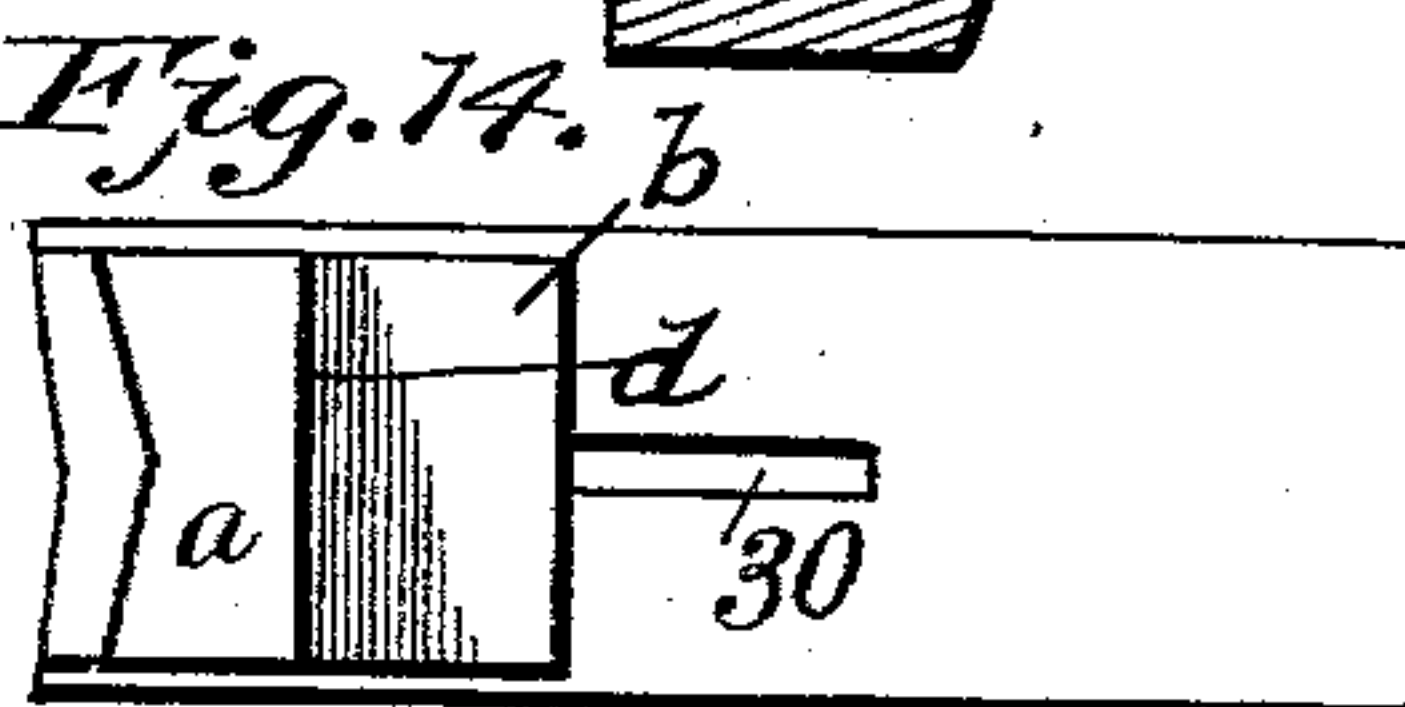


Fig. 15.

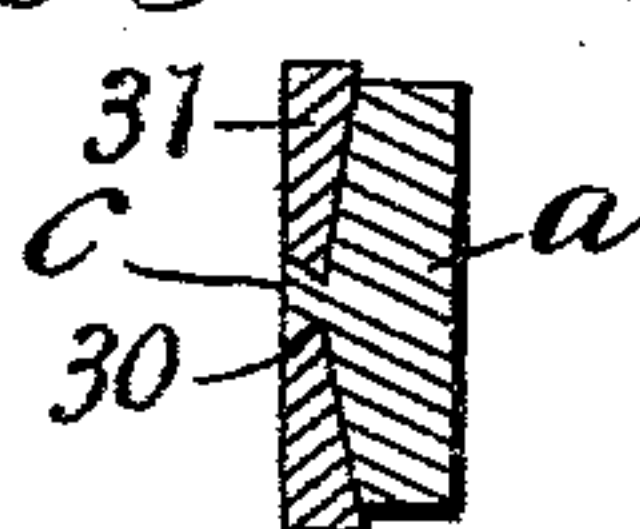
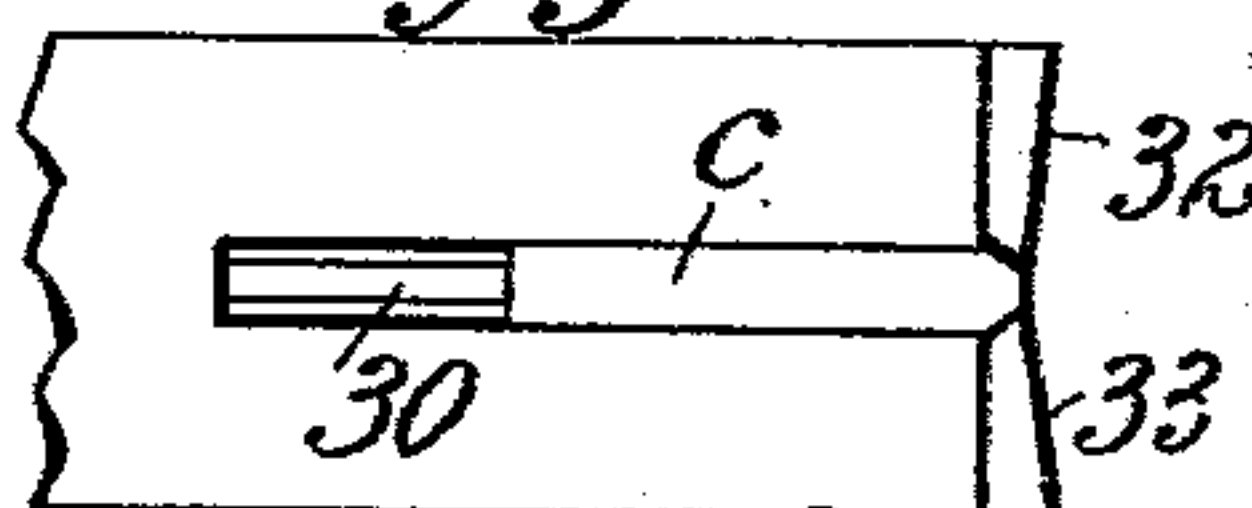


Fig. 16.



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Fig. 4.

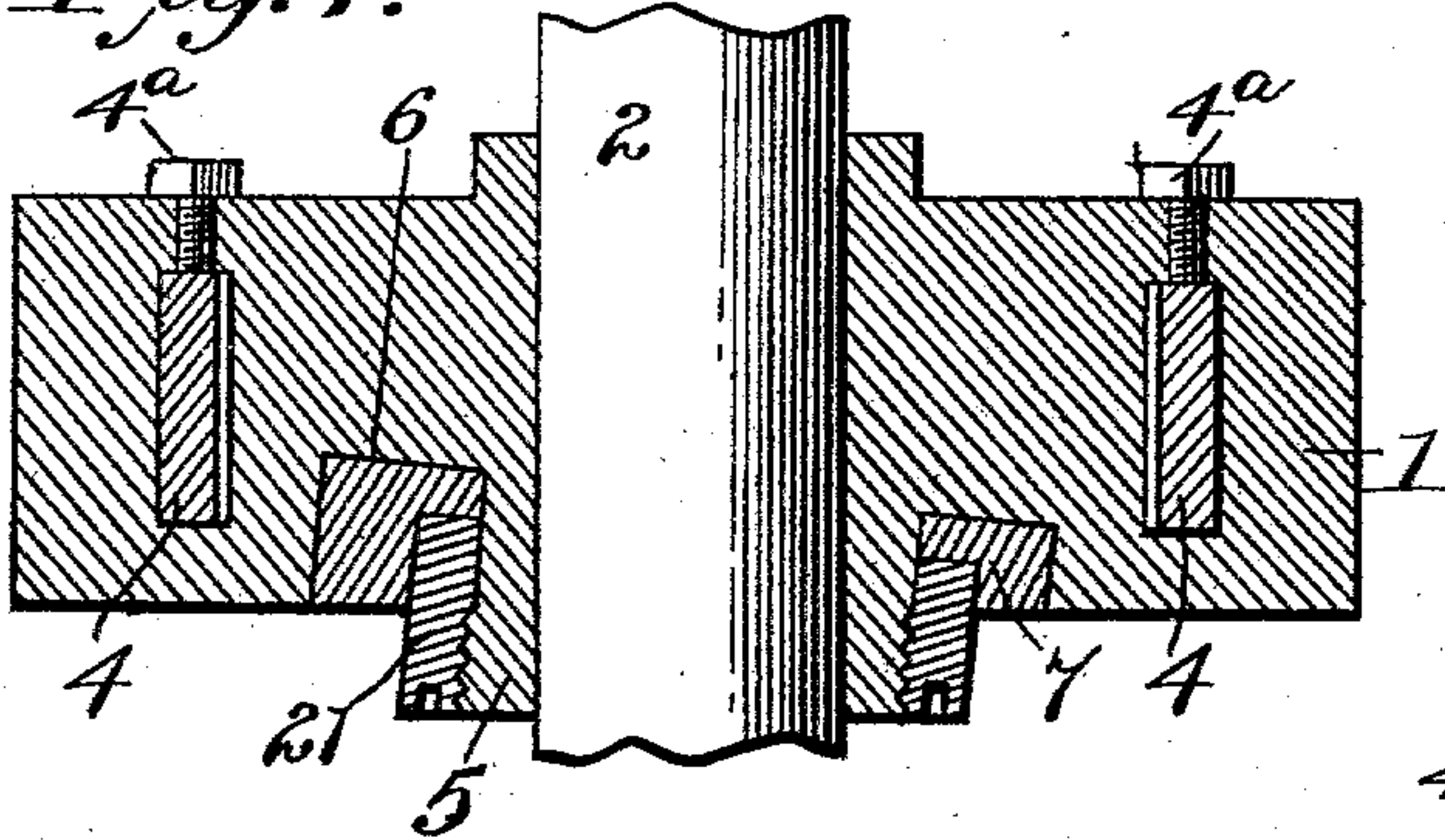


Fig. 7.

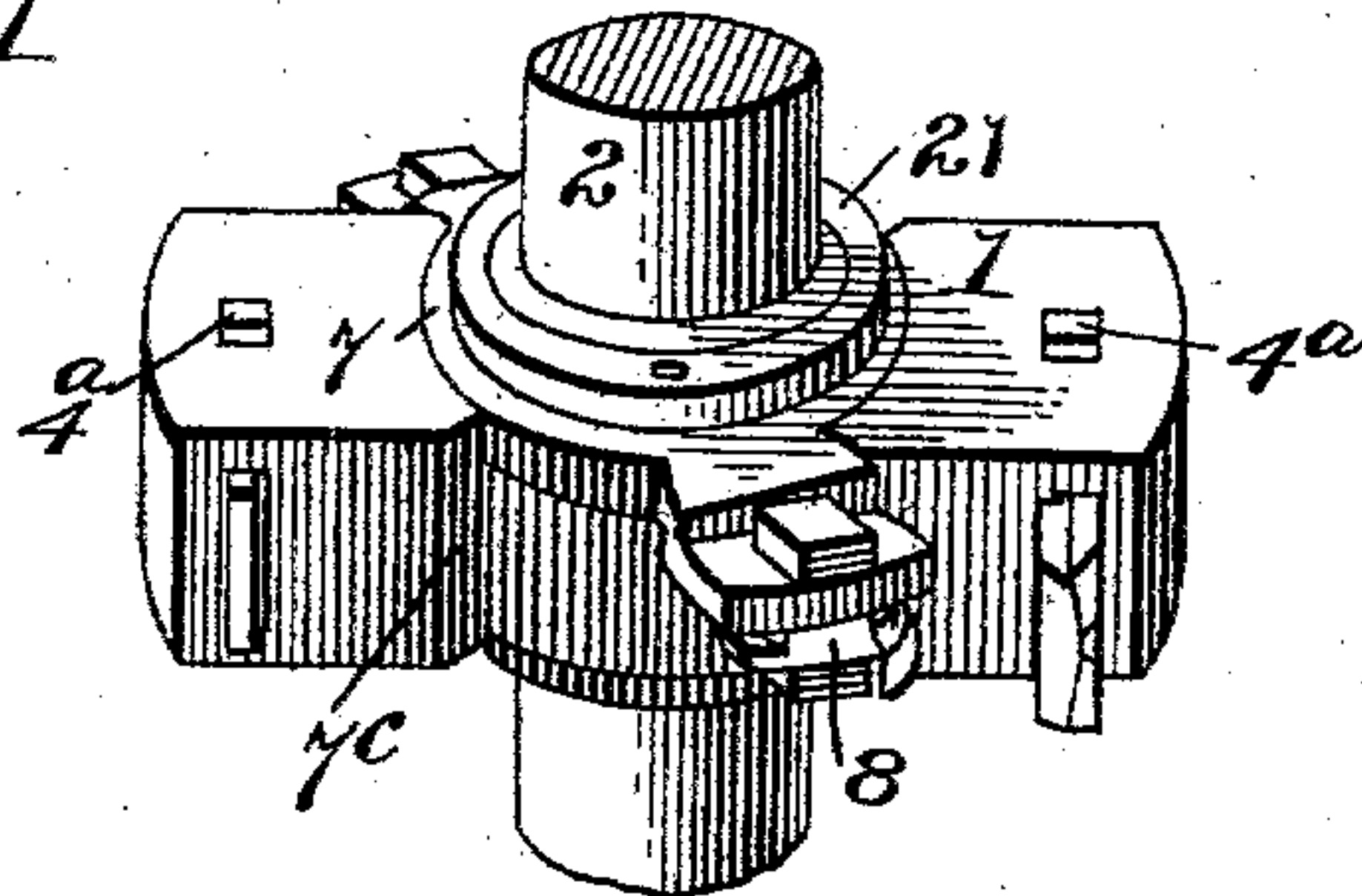


Fig. 5.

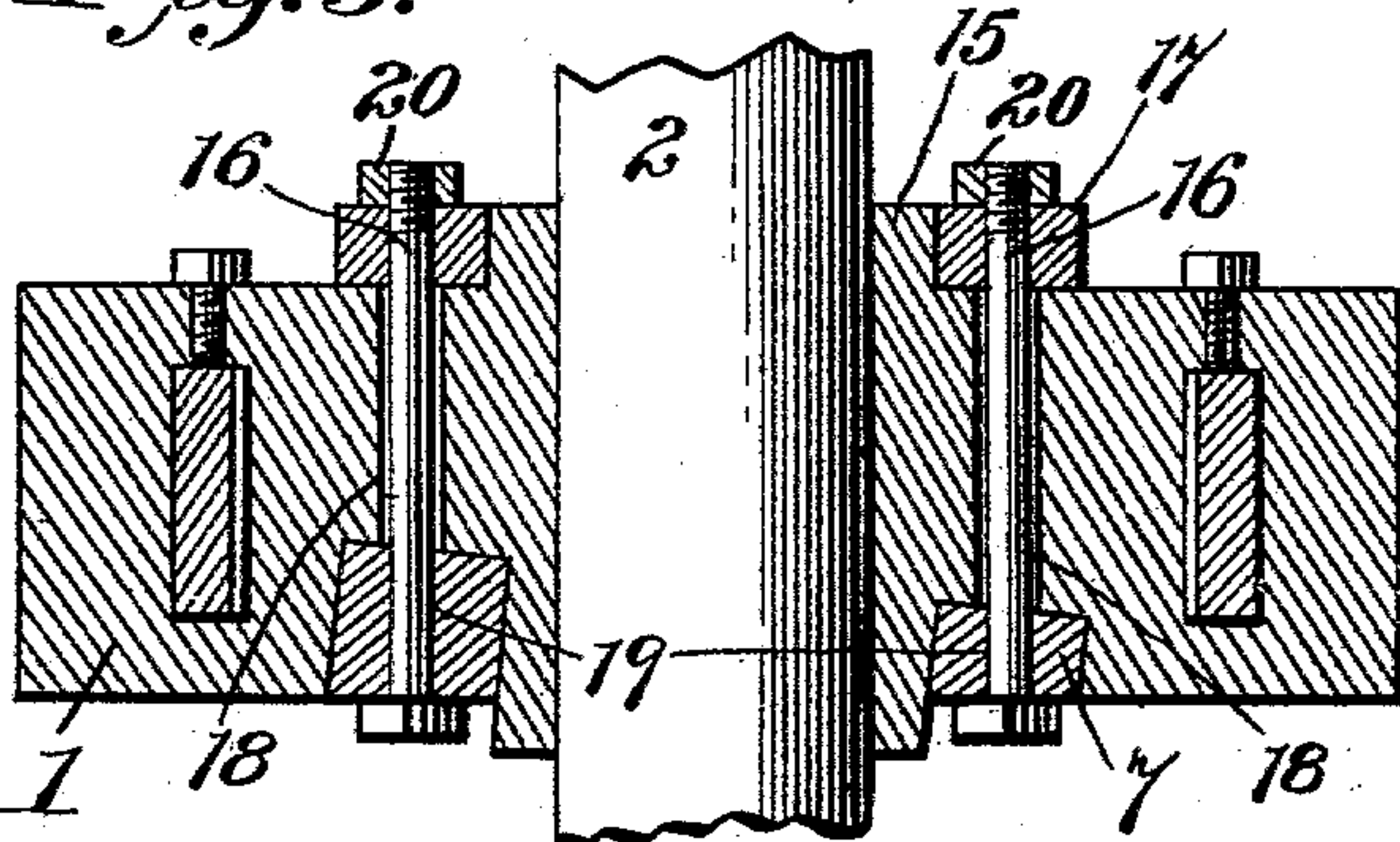


Fig. 8.

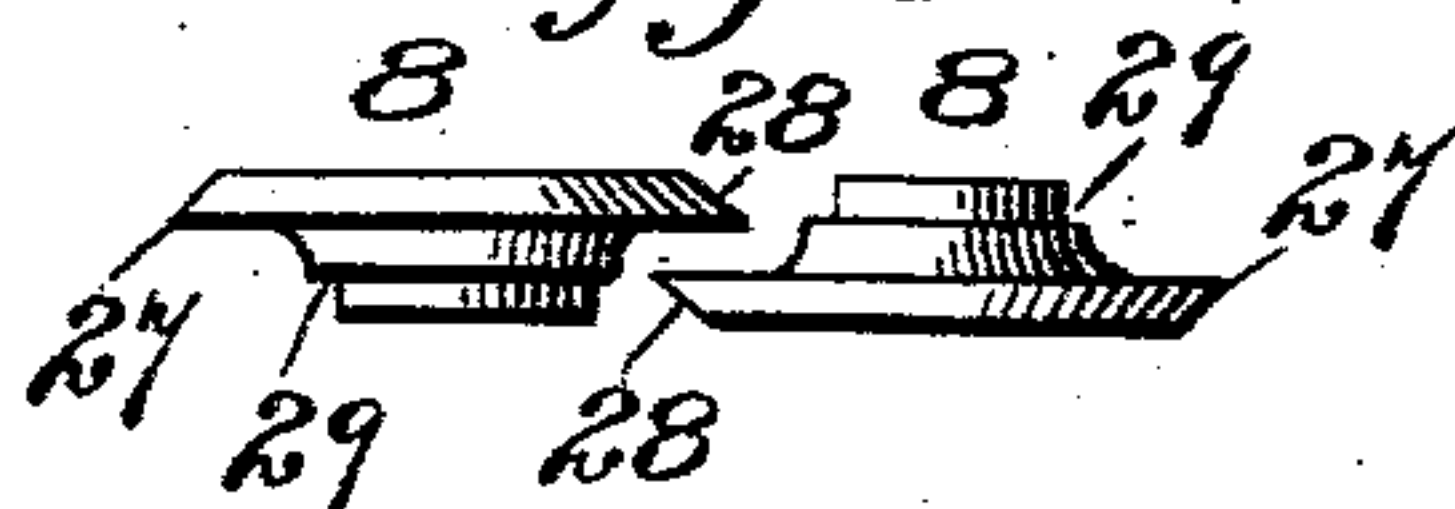


Fig. 6.

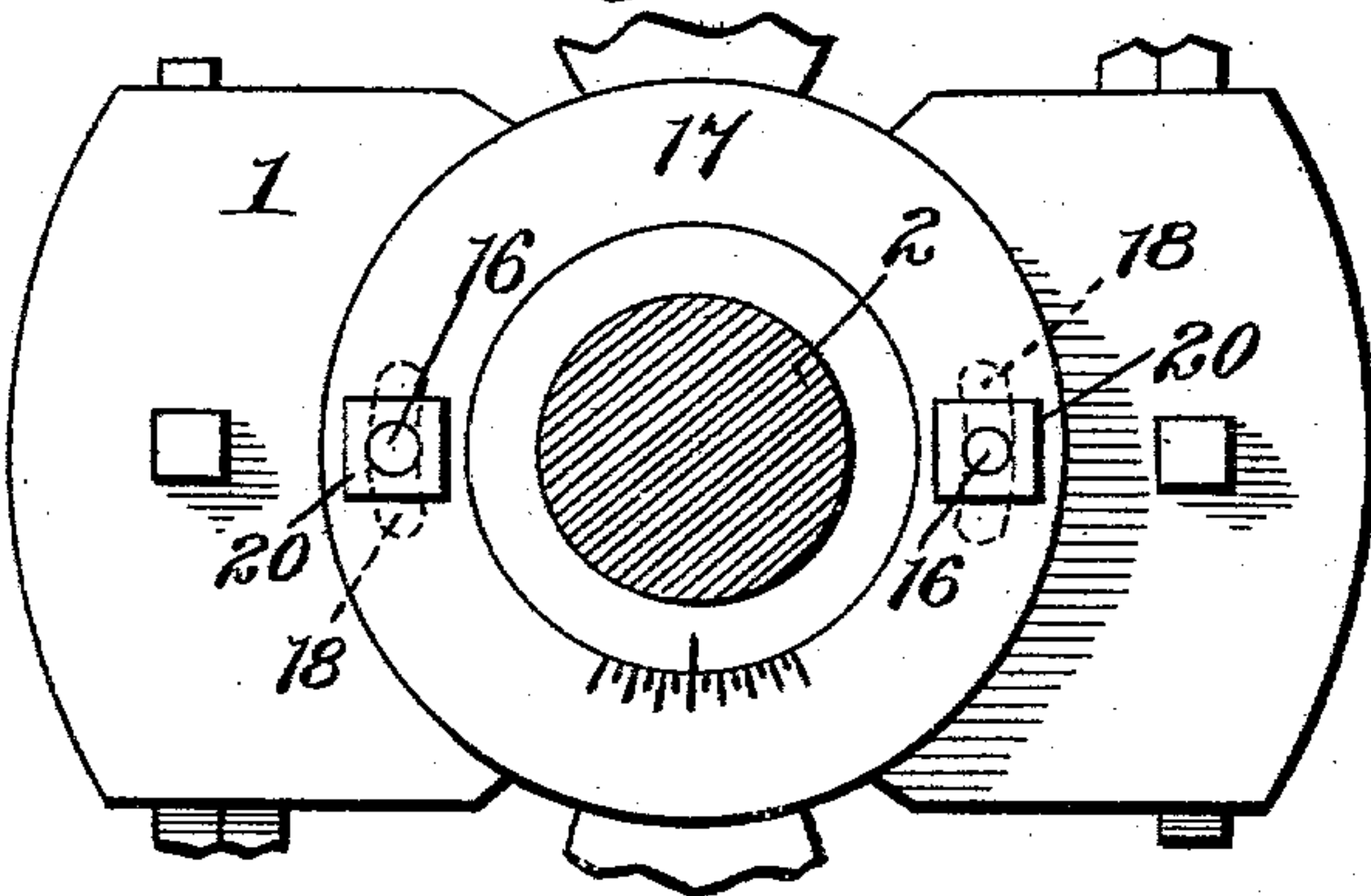


Fig. 9.

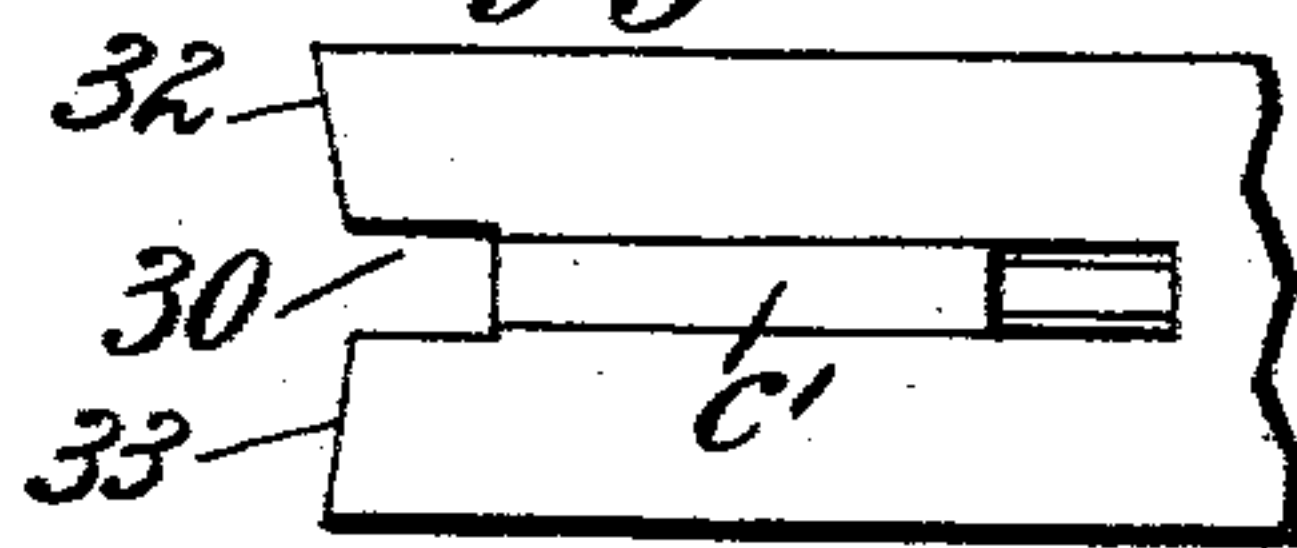


Fig. 10.

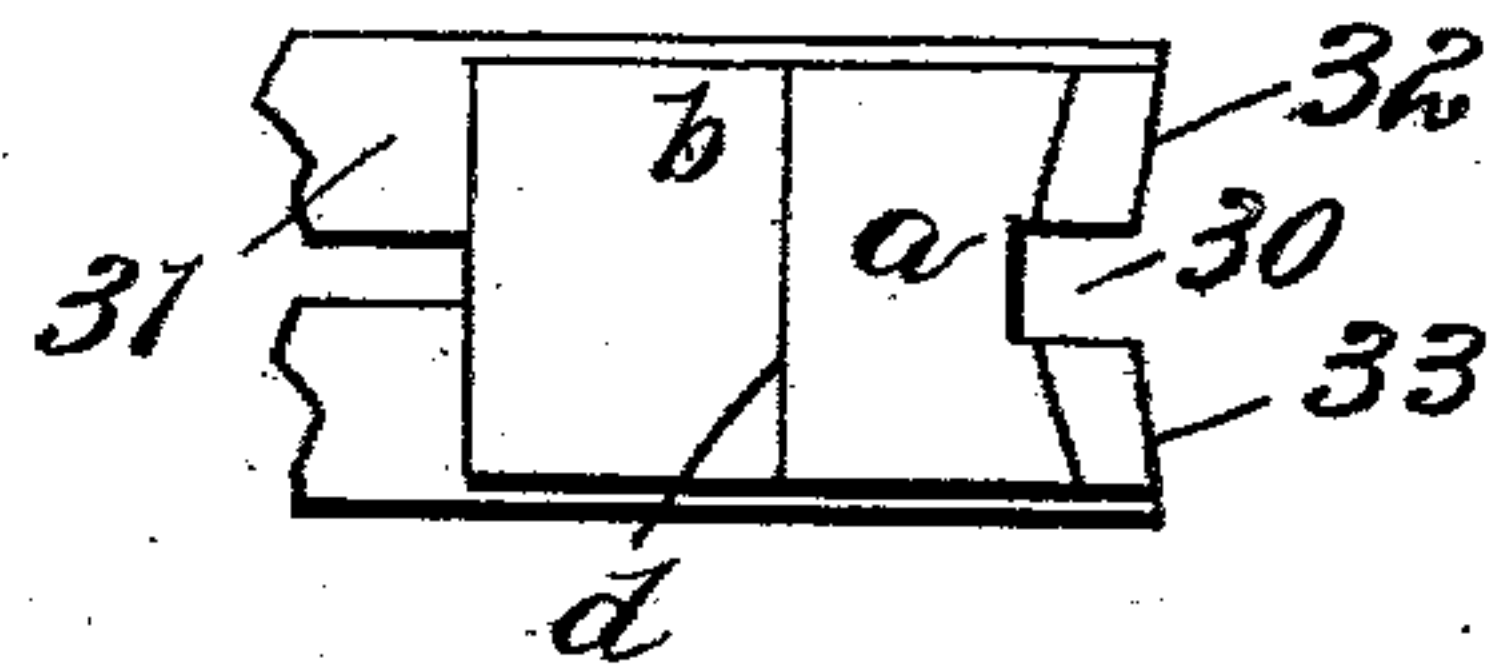
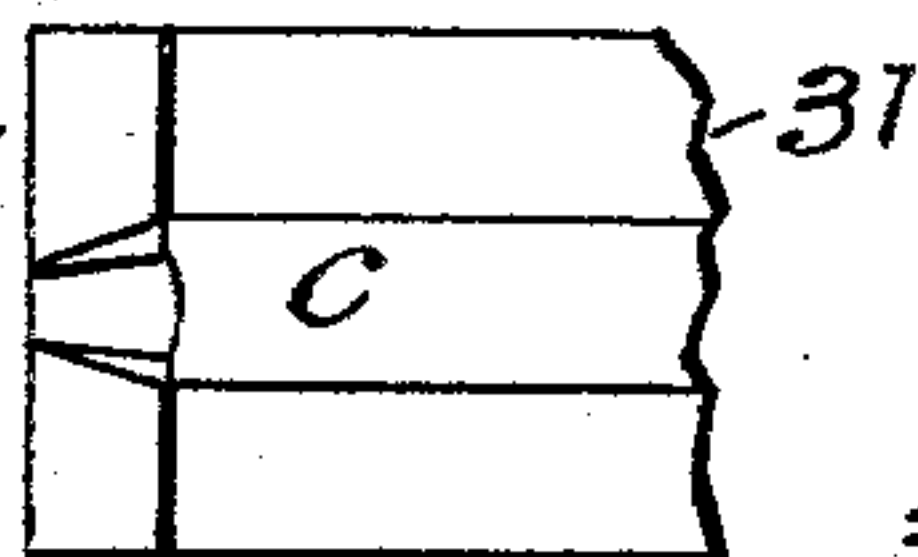


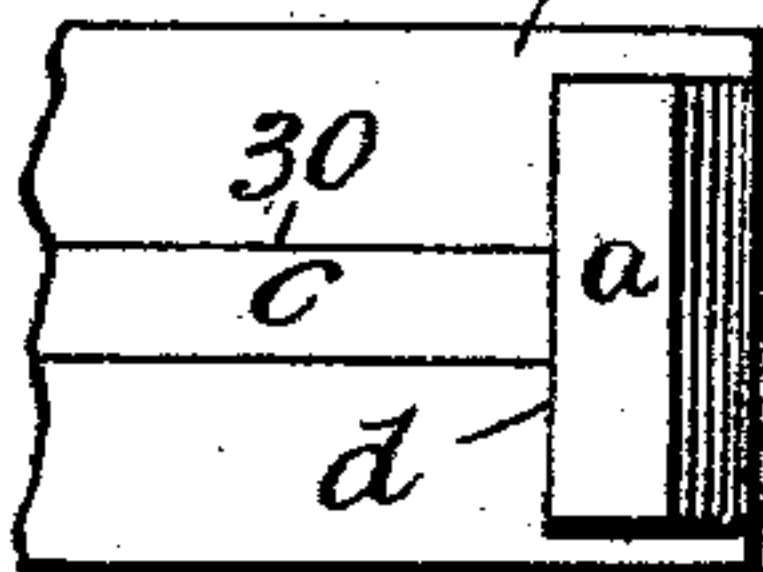
Fig. 11.



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Fig. 12.



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UNITED STATES PATENT OFFICE.

WARREN W. PHILBRICK, OF SEATTLE, WASHINGTON.

MATCHER-HEAD.

SPECIFICATION forming part of Letters Patent No. 629,814, dated August 1, 1899.

Application filed February 20, 1899. Serial No. 706,206. (No model.)

To all whom it may concern:

Be it known that I, WARREN W. PHILBRICK, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Matcher-Heads; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention has relation to certain new and useful improvements in the construction of matcher-heads for use in tonguing and grooving, rabbeting, jointing, or otherwise matching the edges of boards or other lumber; and it consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

The objects of my invention are to provide improved means for mounting and adjusting the circular bits which are employed in forming and finishing the tongues, grooves, or rabbets upon the edges of the boards, such means being capable of application to different forms of matcher-heads now in use, and to provide jointing-cutters, chip-breakers, and cutting-bits of improved character, the whole constituting an improved matcher-head wherein the operation of matching or dressing the edges of the boards is subdivided and performed by four different bits or cutters, two of which joint and dress the upper and lower portions of the edge, while the other two form and finish the intermediate tongue, groove, or rabbet in the manner described in my pending application, Serial No. 671,549, upon which the present invention is an improvement.

Referring to the accompanying drawings, Figures 1 and 2 are central vertical sections of my improved matcher-head, the planes of the two sections being at right angles to each other. Fig. 3 is a bottom plan view of the same. Figs. 4 and 5 are central vertical sections of the matcher-head, showing two different methods for securing the adjustment

of the bit-carrier. Fig. 6 is a top plan view of the head shown in Fig. 5. Fig. 7 is a perspective view showing a modified form of the head. Fig. 8 is a view illustrating the relative arrangement of the two circular bits in forming a tongue. Figs. 9 and 10 are detail views showing in front and rear elevation a portion of one of the jointing-blades used in a tonguing-head with the attached chip-breaker. Figs. 11 and 12 are detail views illustrating the defective work resulting from an improper adjustment of the old form of bit. Fig. 13 is a similar view showing the work with a similar adjustment of my improved bit. Fig. 14 is a detail view of a jointing-blade and chip-breaker suitable for use on a grooving-head. Fig. 15 is a cross-section of the same. Fig. 16 is a rear view of the same, partly broken away. Figs. 17 and 18 are detail views showing a similar chip-breaker applied to a straight-edged cutter, Fig. 17 being a rear view, and Fig. 18 a front view.

In the drawings, the numeral 1 designates the rotary head, which may in general be of various forms and which is mounted upon a spindle 2. This head is provided at opposite end portions with slots 3 for the reception of jointing blades or cutters 4, which are secured in proper adjustment therein by set-screws 4^a or other suitable means. In the bottom side of the head and surrounding a circular boss 5 is turned an approximately circular seat 6 for a bit-carrier 7. The bottom wall of this seat is inclined, having its greatest depth at X and its least depth at Y.

The bit-carrier 7 comprises a bar having an enlarged central or hub portion 7^a, apertured to fit loosely the boss 5, on which it is designed to have a limited rotary movement, and projecting end portions formed with raised bit-seats 7^b. Shoulders 7^c form stops to limit the movement of said carrier. It will be readily seen that when this bit-carrier is seated in a position at right angles to the line of greatest pitch of the seat 6—that is to say, the line joining the points X and Y—the two ends of the bar will be in the same horizontal plane, but that as said bar is rotated upon said seat in either direction one end of said bar will be raised and the other end depressed,

thereby giving a corresponding adjustment to the circular bits 8, which are positioned upon the seats 7^b to vary the distance between the cutting edges of the two bits, and
 5 thereby the thickness of the tongue or width of the groove or rabbet which they form. The head may be provided with scale-marks at 9 to indicate the degree of adjustment.

The bit-carrier 7 may be secured in place
 10 in various ways. A preferable way is that shown in Figs. 1, 2, and 3, wherein angular key-bolts 10 are employed, being set vertically in the head, with hooked projections 11 at their lower ends, which engage a bevel-groove 11^a, turned in the under side of the carrier, and similar projections 11^b at their upper ends, which engage a bevel wall-groove 13, turned in a nut 14, which is screwed upon the hub 15 of the head. By turning this nut
 15 the bit-carrier can, as will be readily seen, be loosened to permit its desired adjustment and tightened to secure such adjustment. Another mode of securing the carrier is that shown in Fig. 5, wherein vertical bolts 16 are
 20 employed. These bolts pass through a collar 17 on the hub 15, segmental slots 18 in the head, and through holes 19, tapped in the bit-carrier, being secured by nuts 20. The collar rotates with the bit-carrier when the
 25 latter is adjusted and is provided with a scale to indicate the degree of adjustment. Still another mode is that shown in Fig. 4, where a nut 21 is screwed upon the boss 5, which is threaded to receive it, the vertical axis of its
 30 thread being perpendicular to the inclined wall of the seat 6, so that the nut will seat flat upon the inclined lower face of the bit-carrier.

The circular bits 8 are secured to the seats 7^b
 40 by means of bolts 23, provided with threaded upper end portions to receive nuts 24 and with squared heads at their lower ends, which seat against square shoulders 25 on the under side of the bit-carrier, whereby the bolts are
 45 held from turning. These bits are preferably of the form shown in Figs. 2 and 8—that is to say, in the form of disks cut away at 26 and beveled to form the oblique cutting edges 27. The peripheral edges of tonguing-bits
 50 are formed with a receding bevel 28, the purpose of which is as follows: If these bits were provided with square edges and were set slightly too much in advance of the jointing-cutters or not sufficiently in advance thereof,
 55 the result would be a slight groove formed in the edge of the board at the base of the tongue, such as indicated at Y in Fig. 11, or a slight shoulder, such as indicated at Y' in Fig. 12, whereas by the provision of the upward bevel
 60 with a similar adjustment of the bit the result is a slight beveled incut at the base of the tongue, as shown at Y² in Fig. 13, which is rather of an advantage than otherwise, as tending to produce a better joint in the matched
 65 stuff. It is necessary, however, that care should be taken to adjust the circular bit but slightly in advance of the jointing-bit.

The circular bits for grooving-heads may be of the usual disk form; but for tonguing purposes they are preferably of the construction shown—that is to say, each has a shoulder portion 29 below (or above) the cutting portions, so that when seated in reversed positions upon the ends of the bit-carrier and the latter is in horizontal position—*i. e.*, in a position at right angles to the line xy —the cutting edges of the two bits will be separated vertically, as indicated in Fig. 8. In this position of the bit-carrier and bits there is formed the widest tongue which it is practicable to make, since if said bar be moved to carry the upper cutting-bit to a higher plane and the lower cutting-bit to a lower plane the cutting edges of the bits will be directed, respectively, away from the planes of the upper and lower faces of the tongue to be formed. If, however, said bit-carrier be moved in the opposite direction to depress the upper cutting-bit and raise the lower cutting-bit, the cutting edges of the two bits are brought nearer together and a narrower tongue is formed. In a grooving-head, however, wherein the bits are of flat disk form when the bit-carrier is in horizontal position the cutting edges of the two bits are in the same horizontal plane; but as the bar is adjusted to raise the upper cutting-bit and depress the under cutting-bit their edges are of course separated vertically and a correspondingly wider groove results. When the bar is in horizontal position with the shouldered tonguing-bits above described, it will be observed that the two bits and their respective securing devices are included between the same planes, so that there is a perfect balance when the head is in rotation, and inasmuch as the adjustments described for the purpose of varying the thickness of tongues does not ordinarily exceed three-sixteenths of an inch this balance is not perceptibly disturbed.

Owing to the inclination of the seat 6 the bit-carrier is caused to have an inclination when adjusted to a position oblique with respect to the line xy in the direction of its length, so that when adjusted in the manner above described proper point clearance of the bits is provided for and said carrier has an inclination in the plane of the line xy , which provides the necessary side clearance for said bits.

Instead of forming the seat 6 in the under side of the head it may obviously be formed in the upper side, as shown in Fig. 7. It will be readily seen that by turning this seat in the bottom or top of a head and securing the bit-carrier thereto, as described, an expansion-head may be made of any two-sided or two-winged jointer-head without injuring it for its original work. The circular bits cutting in conjunction with the square or straight jointing bits or cutters already in the head or secured in the seats already provided therefor form a very desirable combination, as the straight bits have a better clearance for cut-

ting the square parts of the edges of the tongues and grooves, and the circular bits can be given a better clearance for cutting and dressing the edges of the grooves or the top and bottom of the tongue.

The jointing-cutters which I prefer to employ are of the following character: The blade for use on a tonguing-head is slotted at 30 to pass the tongue formed by the circular bits and is concaved on its forward face, as shown at 31. It is ground to form the beveled separated upper and lower cutting edges 32 and 33, which respectively recede somewhat toward the center, as shown, the purpose being to give them a shearing action from the top and bottom edges of the boards toward the center, where they meet the cuts formed by the circular bits, in this manner preventing all tearing, splitting, or breaking of the edges and angles of the matched faces and preserving their trueness and accuracy of outline. It is in securing this result that the advantage of employing the circular bits in connection with the jointing-bits is found.

In connection with these cutters I employ a chip-breaker, such as shown in Fig. 10, and which is applicable to both the tonguing and grooving heads where the cutters are seated in slots of the heads. When the cutters are secured to the outside of a flattened or two-sided head, these breakers will not be required. The chip-breaker consists of a portion *a*, which projects from the head and is convexed on its inner face to fit the concavity of the cutter-blade, a reduced portion *b*, which enters the slot 3 with the cutter-blade, and a rib or lip *c*, which projects into the extended slot 30 of said blade. The forward or outer end of the part *a* is beveled and shaped to conform to the cutting end of the blade, as shown. The rib *c* and the slot 3 are preferably of dovetailed character.

The same general form of breaker may be applied with advantage to a straight-edged cutter, such as shown in Figs. 17 and 18. The shoulders on the breaker at *d* prevent it from shoving back into the head.

The general form of the cutting edges of the bits and cutters herein described may of course be varied to suit the particular character of work which they are to perform.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a matcher-head, the combination with the head having an approximately circular seat turned in one of its horizontal faces, the inner wall of said seat being diametrically inclined, of a bit-carrier rotatably held in said seat and resting on said inclined wall, and bits carried by the end portions of said carrier, substantially as specified.

2. In a matcher-head, the combination with a head having in one of its horizontal faces, a seat or recess whose inner end wall is diametrically inclined, of a bit-carrier having its hub portion rotatably fitted to said seat, bits

secured to the end portions of said carrier, and means for securing said carrier in proper adjustment, substantially as specified.

3. In a matcher-head, the combination with a head having a seat or recess in one of its horizontal faces whose inner end wall is diametrically inclined, and a hub or boss extending centrally through said recess, of a bit-carrier rotatably seated in said recess upon the said boss, and resting on the inclined wall, bits carried by the end portions of said carrier, and means for securing the adjustment of said carrier, substantially as specified.

4. In a matcher-head, the combination with a head having a seat or recess in one of its horizontal faces, formed with a diametrically-inclined bottom wall, of a bit-carrier having its hub portion rotatably seated in said recess upon said inclined wall, a recessed nut on the hub of said head, and key-bolts seated in the head and having hooked projections at one end which engage the said carrier and similar projections at the opposite end which engage the recess of the nut, substantially as specified.

5. In a matcher-head, the combination of the head having the recess formed with an inclined wall, the bit-carrier rotatably engaging said recess, the nut, and the key-bolts engaging said nut at one end and the carrier at the opposite end, substantially as specified.

6. In a matcher-head, the combination of the head having the recess formed with an inclined wall, the bit-carrier whose hub portion is rotatably seated in said recess, means for limiting the rotary movement of said carrier, means for securing it in proper adjustment, circular bits seated upon the end portions of said carrier, and means for securing said bits independent of the means for securing the said carrier, substantially as specified.

7. In a matcher-head, the combination with the recessed head, of the bit-carrier rotatably seated in said recess, said carrier having the bits seated at its end portions, and also having shoulders, and bolts for securing said bits, said bolts having squared portions which engage the said shoulders, substantially as specified.

8. The combination with the head proper having jointing cutters or blades arranged to joint the vertical portions of the edge faces of the lumber, and having an intermediate inclined guiding-seat, of a bit-carrier mounted on said head and engaged with said seat, said carrier having a limited rotary movement, and shouldered bits seated on said carrier in reversed position and arranged to operate to impart a special conformation to a prescribed portion of the edge of the lumber, substantially as specified.

9. In a matcher-head, the combination with a head having an inclined guiding-seat and jointing-cutters arranged laterally of said seat, of a bit-carrier adjustably engaging the said seat, the circular bits seated in reversed positions on opposite portions of said carrier

and having shoulder portions adjacent to their cutting portions, and also having receding beveled edges, substantially as specified.

10. In a matcher-head, the combination with
5 a head having an inclined guiding-seat and jointing-cutters arranged laterally of said seat, of a bit-carrier adjustably engaging said seat, and cutting-bits having their edges
10 formed with receding bevels, the bit upon one end or side portion of said carrier being in vertically-reversed position with respect to the bit upon the opposite end portion, substantially as specified.

11. In a matcher-head, the combination with
15 the head having the jointing-cutters, and the seat or recess formed in one of its horizontal faces, said seat or recess having an inclined bottom wall, of the bit-carrier having a hub portion rotatably seated in said seat or recess
20 against said inclined wall, and the circular bits on the end portions of said carrier, and arranged to act upon intermediate portions of the edges of the material being operated upon, substantially as specified.

12. In a matcher-head, the combination with 25
a slotted jointing-cutter, of a chip-breaker fitted to the forward face of said cutter and having a rib which engages the slot thereof, and also a shoulder which engages the head, substantially as specified. 30

13. In a matcher-head, the combination with
a slotted jointing-cutter, of a chip-breaker fitted to the forward face of said cutter and having a longitudinal rib which engages the slot of said cutter, substantially as specified. 35

14. In a matcher-head, the combination with
a slotted jointing-cutter, of a chip-breaker fitted to the forward face of said cutter, and having a longitudinal rib which engages the slot of said cutter, said rib and slot having a 40
dovetailed engagement, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

WARREN W. PHILBRICK.

Witnesses:

WINFIELD R. SMITH,
PIERRE BARNES.