

No. 827,725.

PATENTED AUG. 7, 1906.

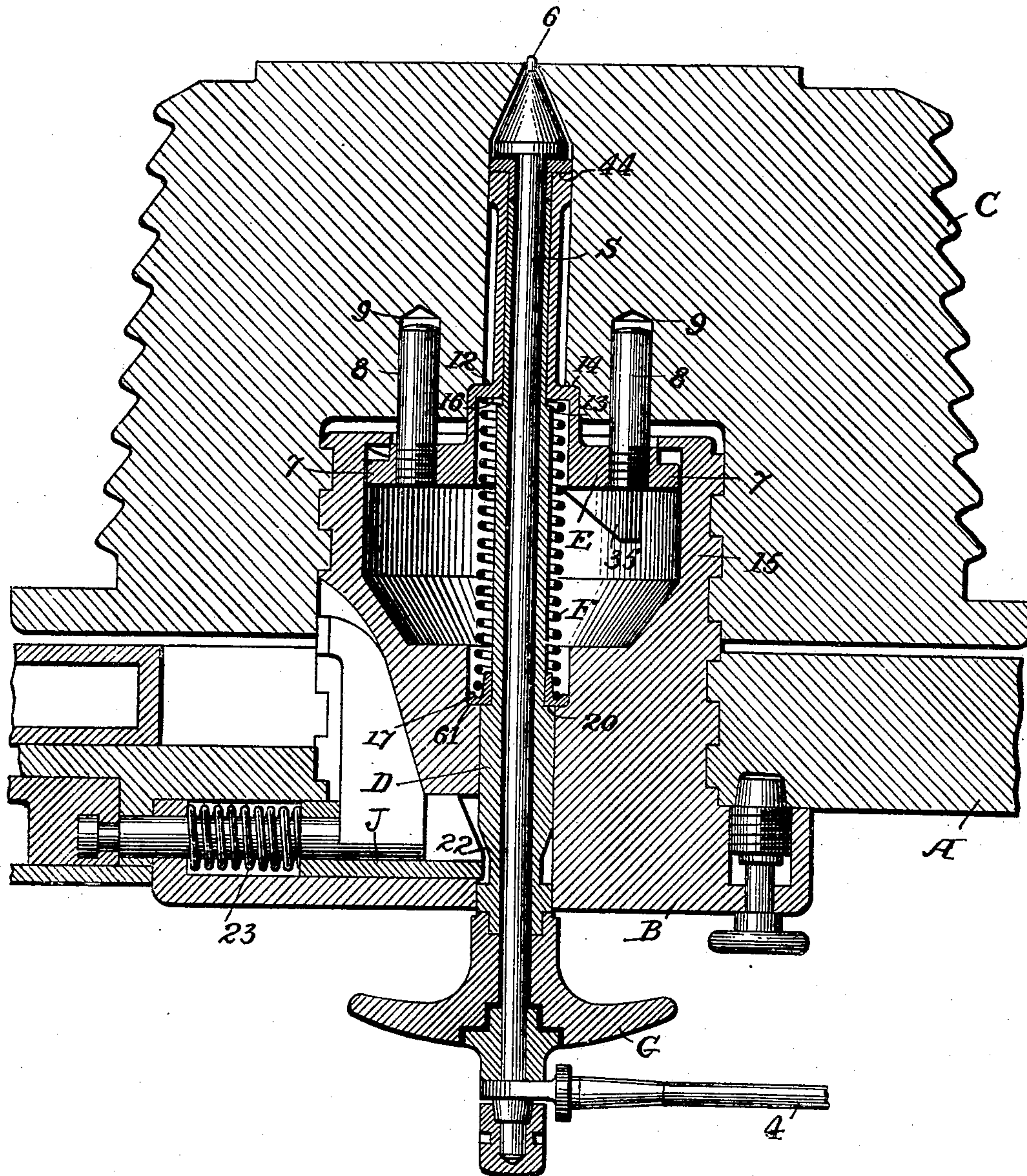
S. A. S. HAMMAR.

FIRING GEAR.

APPLICATION FILED JAN. 16, 1903.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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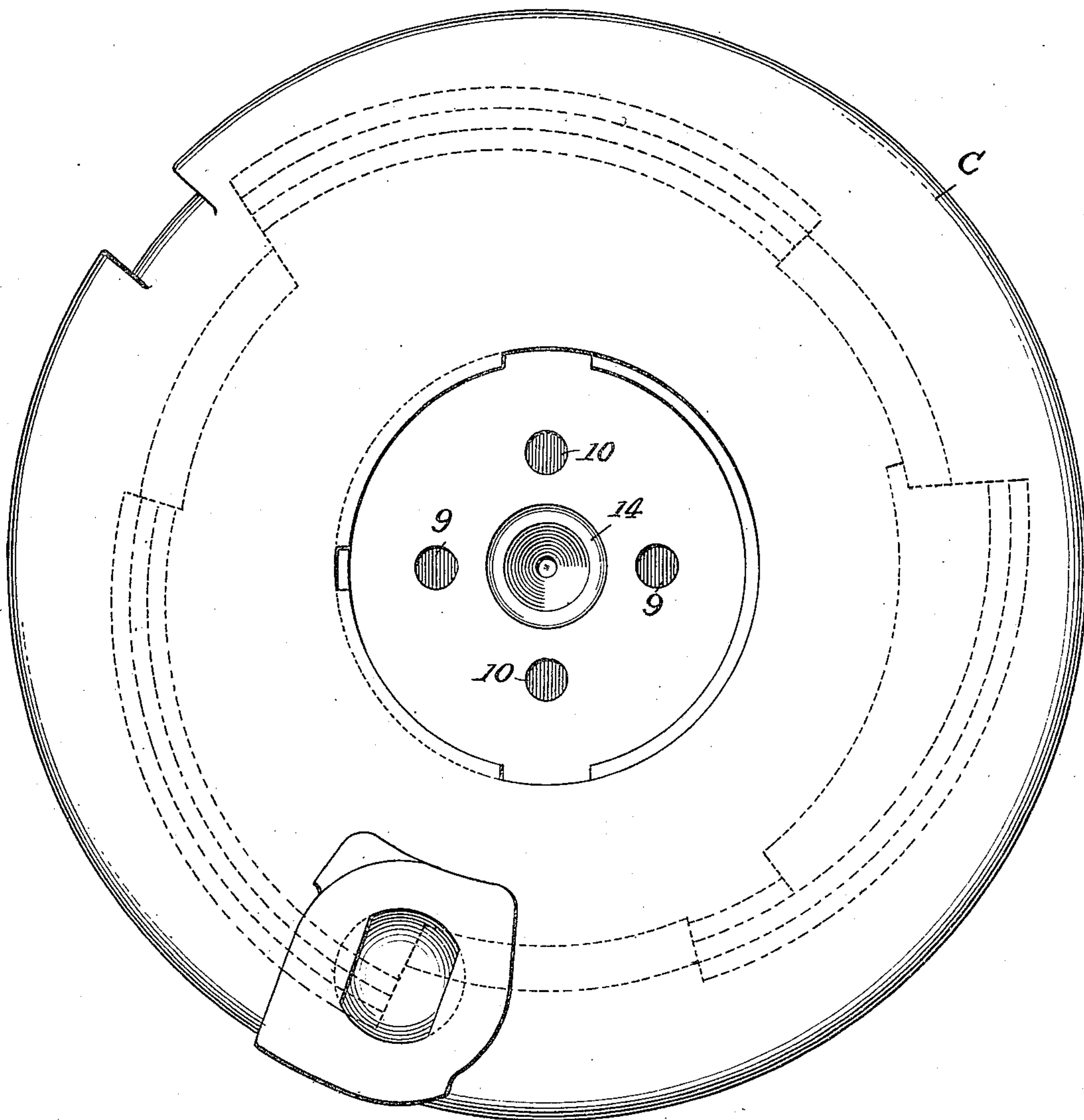
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4 SHEETS—SHEET 2.

Fig. 2.



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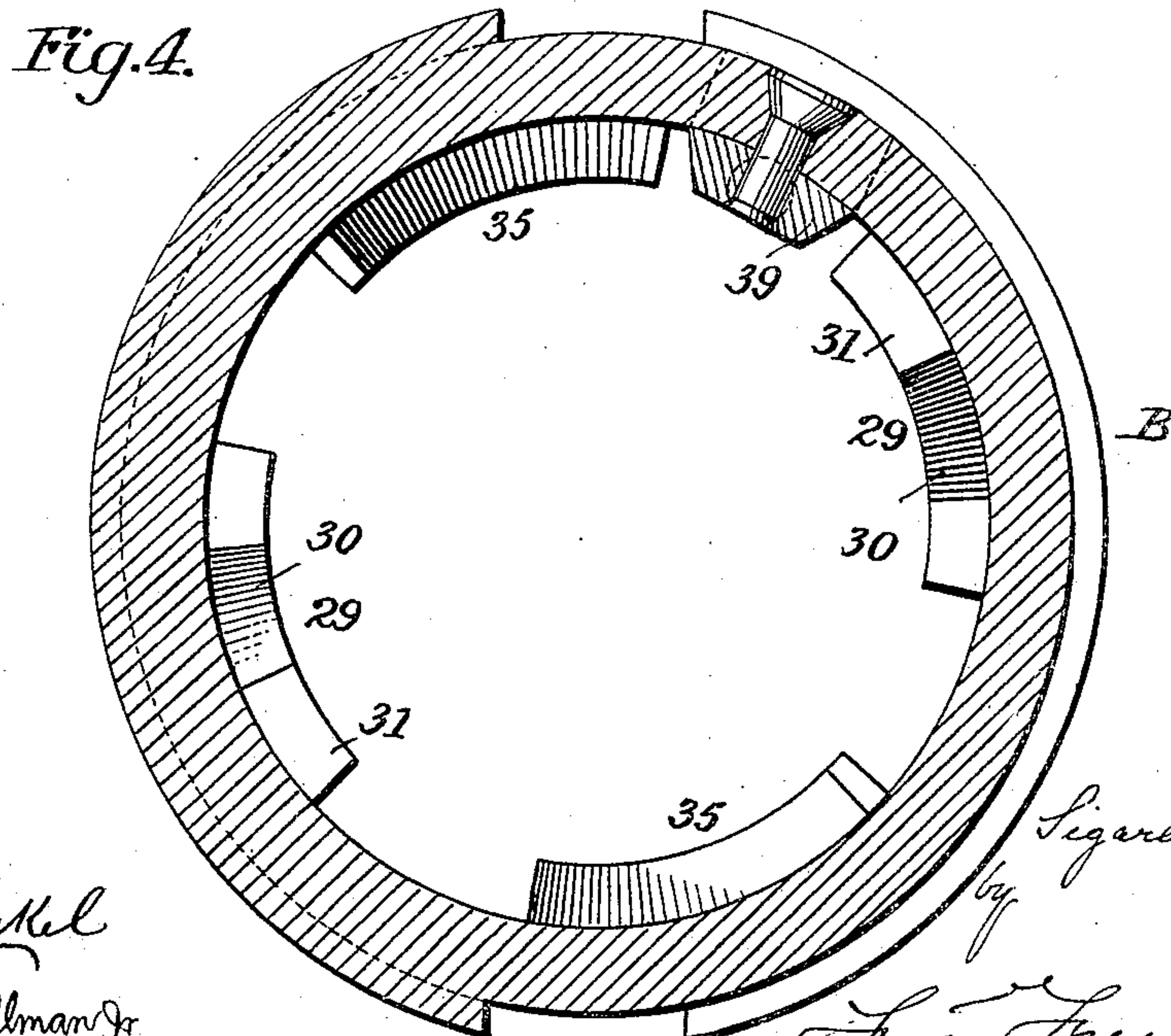
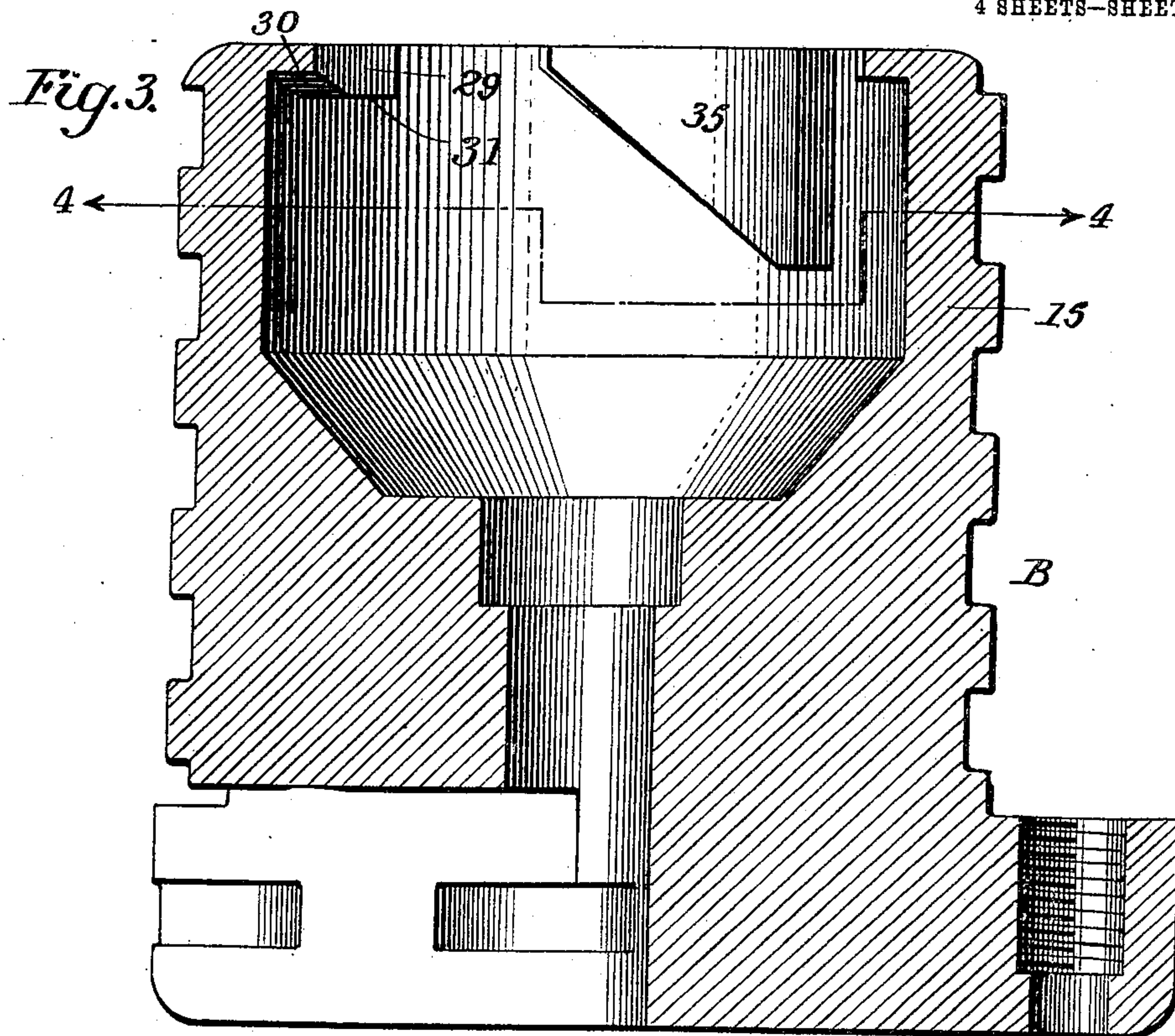
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 7.

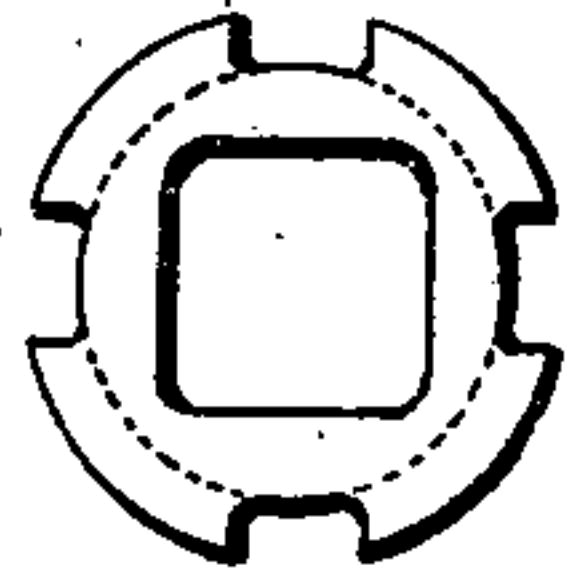


Fig. 5.

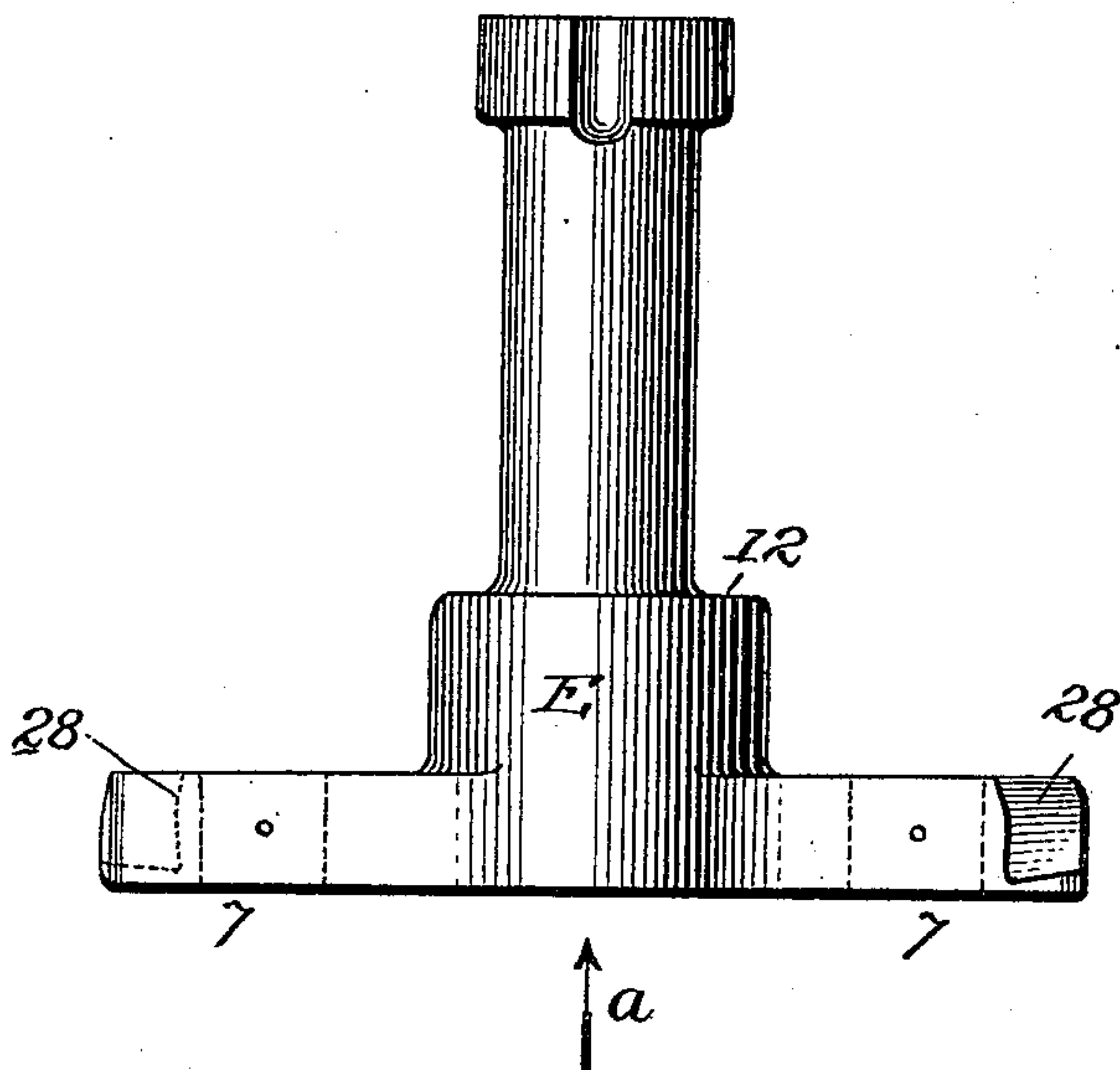


Fig. 6.

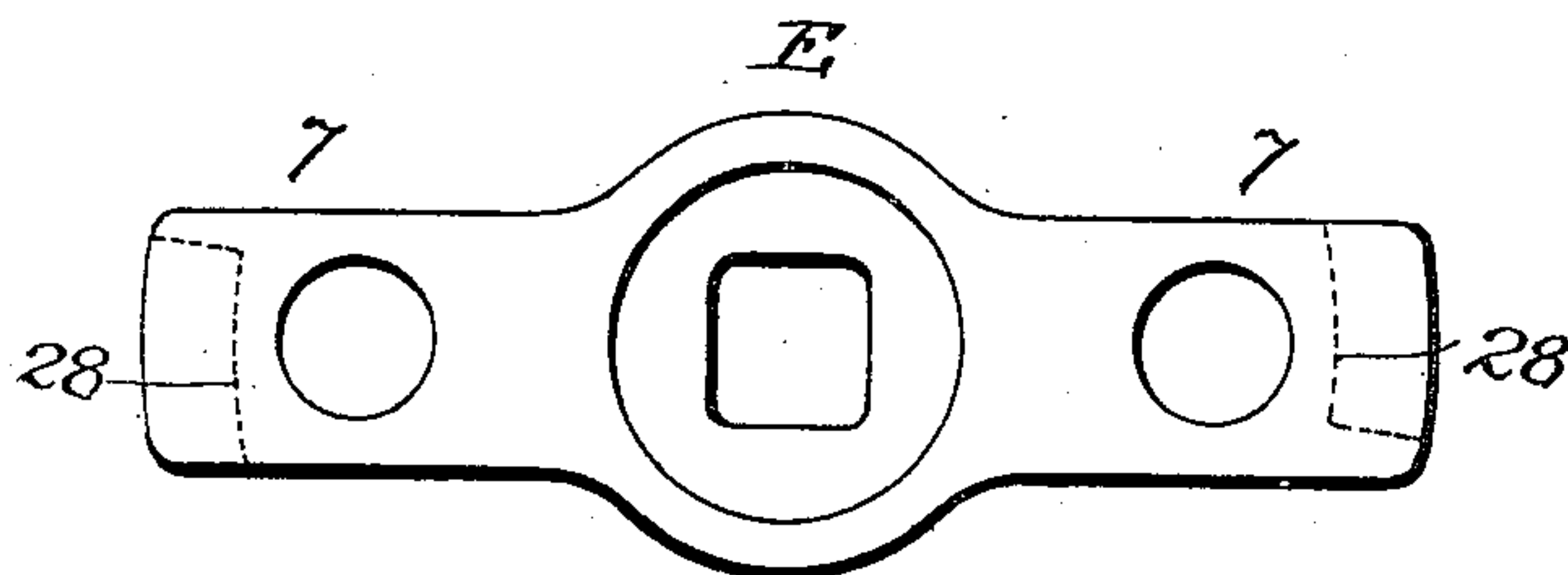


Fig. 10.

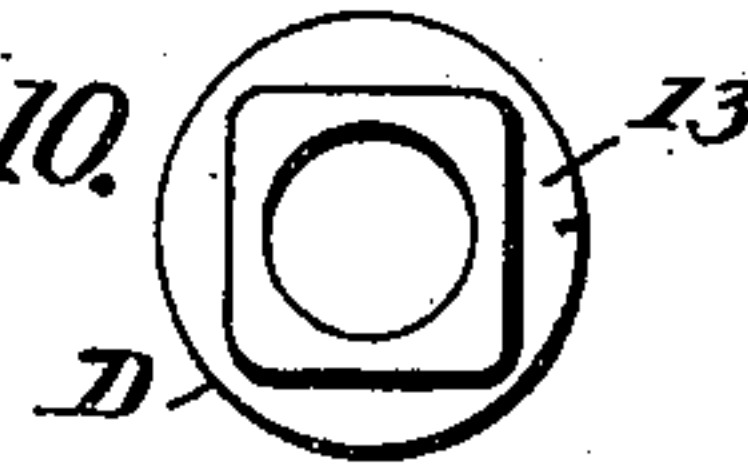


Fig. 8.

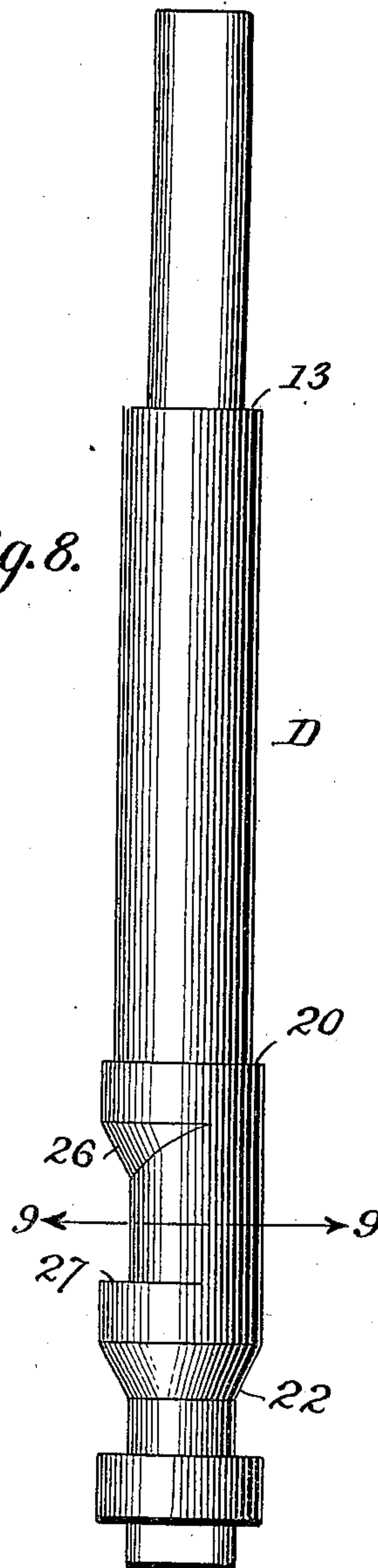
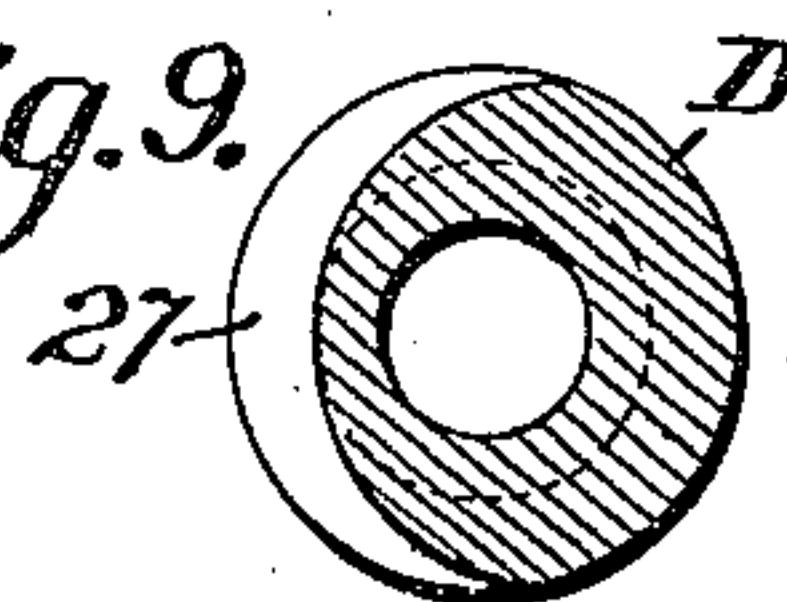


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

SIGARD A. S. HAMMAR, OF SOUTH BETHLEHEM, PENNSYLVANIA,
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FIRING-GEAR.

No. 827,725.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed January 16, 1903. Serial No. 139,331.

To all whom it may concern:

Be it known that I, SIGARD A. S. HAMMAR, a subject of the King of Sweden and Norway, residing at South Bethlehem, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Firing-Gear, of which the following is a specification.

My invention relates to the breech mechanism of guns, and more especially to the parts connected with the firing mechanism; and it consists in constructing the parts so as to explode the primers, either electrically or by percussion, and so as to avoid liability to explode the primer prematurely, as fully set forth hereinafter, and as illustrated in the accompanying drawings, in which—

Figure 1 is a section showing part of the breech mechanism of a gun embodying my improvements; Fig. 2, a rear elevation of the breech-block; Fig. 3, a longitudinal section of the hub; Fig. 4, a transverse section on the line 4 4, Fig. 3; Fig. 5, a side view of the cocking-head; Fig. 6, an end view of the cocking-head looking in the direction of the arrow *a*, Fig. 5; Fig. 7, an end view of the stem of the cocking-head; Fig. 8, a side view of the firing-head; Fig. 9, a section on the line 9 9, Fig. 8; and Fig. 10 an end view of the cocking-head.

A is the carrier-plate of the gun, hinged at one side, (the hinge not shown;) B, the hub; C the breech-lock, all of which parts may be of any suitable construction and combined with means whereby the breech-lock may be turned upon the hub and whereby the carrier-plate may be swung in and out, as usual.

The firing-pin S has at its inner end a nipple 6, which constitutes the terminal point in electric firing or the striking-point in percussion firing, and this firing-pin is insulated in a tubular support constituting therewith the firing-head D, and which support extends through the hub into a recess in the breech-block and also through a cocking-head E, the disk of which lies within a recess in the hub B, while the stem extends into the recess in the block C. That portion of the firing-head which extends through the cocking-head is rectangular in cross-section, so that the firing-head and cocking-head will turn together, the rotation being permitted by the

cylindrical form of that portion of the firing-head which passes through the hub. The turning of the cocking-head E independently of the breech-block is normally prevented by pins 8 8, carried by the cocking-head, which in one position of the cocking-head fit and slide in two openings 9 9 in the block (see Fig. 2) and in another position in two intermediate openings 10 10, the cocking-head being drawn back to carry the pins out of one pair of openings and then turned to introduce them into the other.

The cocking-head is recessed to receive one end of the firing-spring F, which encircles the firing-head and the rearward thrust of which is resisted by a shoulder 20 of the hub, on which shoulder bears a collar 17, and a shoulder 13 of the firing-head when the latter is forward bears on a shoulder 16 of the cocking-head.

A shoulder 44 at the forward end of the firing-head is opposite the end of the stem of the cocking-head, and the spring F, surrounding the firing-head and bearing on the shoulder 16 of the cocking-head and on the collar 17, as stated, thrusts the collar against the shoulder 20 of the firing-head D, while also carrying the cocking-head forward, so that a shoulder 12 thereof bears against a shoulder 14 of the breech-block. These parts are so proportioned that the cocking-head has a limited travel between the shoulders 44 and 13 of the firing-head, and normally the nipple 6 projects beyond the inner face of the breech-block, as in Fig. 1, when the gun is closed and unloaded.

A handle G is secured to the rear end of the firing-head, so that the latter may be drawn to the rear to carry the cocking-head, also to the rear until the pins 8 8 are withdrawn from one set of openings, and then permit the firing-head and cocking-head to be turned to insert the pins in the other set of openings. The firing-head, Fig. 8, is provided at one side with a depression 26, forming a shoulder 27, which when the firing-head is carried back and turned to a position for percussive firing engages the end of a suitable sear J, thrown inward by the action of the spring 23, when the parts will be held in their outward position until the sear is drawn laterally to release the firing-head, which will then be

carried forward under the action of the spring F to project the firing-point 6 against and explode the primer.

When the parts are in the forward position, the end of the sear projects into an annular groove of the firing-head, which groove has an inclined face 22, Fig. 1, that forces the sear outward when the firing-head is carried back.

While it is desirable that the nipple 6 shall normally project beyond the breech-block face, as before stated, it is at the same time a matter of the greatest importance to prevent the primer from being struck by the nipple in swinging the block against the cartridge-case in closing the gun, and I therefore provide means whereby on the rotation of the breech-block in opening the gun the nipple is carried rearwardly to a position inside the breech-block and is there held until after the block has been inserted in the breech and has struck the cartridge-face. In electric firing the nipple will then be carried slowly toward its seat and against the primer as the rotation of the breech-block is completed. To effect this, the cocking-head is provided with wings 7 7, which carry the pins 8 8 and which have terminal inclined faces 28 28, and within the hub B upon a forward flange 15 thereof are stationary curved cams 29, the rear faces of which engage the faces 28 28 of the cocking-head as the latter, turning with the breech-block, begins its rotation prior to removal, thereby drawing back the cocking-head and firing-head until the nipple is back of the forward face of the breech-block. The wings 7 then pass onto the flat faces 31 of the cams 29, upon which they rest during the remainder of the rotation of the breech-block. By this means the cocking-head and its adjuncts are restrained from moving forward until the rotation of the breech-block in closing the gun carries the cocking-head wings at first off the faces 31 and during the terminal part of the rotation down the sloping faces 30 until the nipple 6 of the firing-pin S is brought by a slow movement against the primer.

If the electric contacts fail or when from any other reason it is desired to fire the gun percussively, the firing-head with the cocking-head are drawn back to carry the pins 8 8 out of the openings 9 9, and they are then turned and released to allow the pins to pass into the openings 10 10. In this position the turning of the breech-block and cocking-head will bring the inclined faces 28 upon the inclined faces of another pair of stationary cams 35 35 of greater throw than the cams 29 when the firing-head will be carried to the rear, compressing the spring F until the shoulder 27 is carried past the sear J. A stop 39 prevents the cocking-head from being turned beyond its position for percussive firing. The inclined faces of the cams 35 are

at such an angle that in a length less than the travel of the faces 28 thereon in rotating the breech-block the cocking-head is given the necessary retraction, and the firing-head is held beyond its cocked position during and after the opening of the gun. As the breech is closed the firing-head moves forward until engaged by the sear, while the firing-head and cocking-head are turned until at the final closing movement the wings 7 are no longer opposite the cams 35, so that when the sear J is withdrawn the cocking-head and firing-head can together move forward under the action of the spring F, bringing the nipple 6 percussively against the primer.

It will be seen that the momentum of the firing-head causes it to travel forward a limited distance after its shoulder 20 has struck the rear face of the collar 17, carrying the latter with it and slightly compressing the firing-spring, so that the nipple 6 will be projected beyond the inner face of the breech-block until the shoulder 13 of the firing-head strikes the shoulder 16 of the cocking-head, after which the spring F will carry back the collar 17 and the firing-head until the nipple assumes its normal position. It will be understood that for electric firing a proper electric conductor 4 is suitably connected with the insulated pin S. It will of course be understood that there may be different cam arrangements for retracting the cocking-head and different means may be used for connecting it, so as to turn with the breech-block and for securing it in different positions and that the guide-pins 8 8 may be secured to the breech-block and pass through openings in the cocking-head instead of the reverse arrangement shown. It will of course be understood that where the gun is to be fired only by electricity but one set of cams, the cams 29, need be provided, or where the gun is to be fired only percussively only the cams 35 need be provided. It will further be evident that the cams 29 35 may be supported in stationary position in any other suitable manner instead of by the hub and that different constructions of firing-heads may be employed.

Without limiting myself to the construction shown, I claim—

1. The combination with the carrier, rotatable breech-block, and cocking-head of a gun, of a firing-head carried by the cocking-head and means for moving the cocking-head forward and back on turning the breech-block, the firing-head having a limited independent longitudinal movement in the cocking-head.

2. The combination of the recessed hub, the breech-block rotatable thereon, cams within the hub, a cocking-head engaging said cams, means for turning the cocking-head with the block, and a firing-head supported

to be carried with the cocking-head and to slide to a limited extent in said cocking-head, substantially as set forth.

3. The combination with the rotatable breech-block, of a cocking-head arranged to slide longitudinally of said block, a firing-head arranged to slide with said cocking-head in both directions, but having a limited sliding movement independently of said head, means for carrying back said firing-head, and a sear engaging the firing-head, substantially as set forth.

4. The combination with the rotatable breech-block of a gun and with the sliding firing-head and sear, of a sliding cocking-head connected to turn with the breech-block and bearing on the firing-head, and two sets of cams, one arranged to slightly carry back the cocking and firing heads at the beginning of the rotation of the breech-block in opening the gun, and the other arranged to act after the cocking-head has been turned to a different position, to retract the cocking and firing heads until engaged by the sear, substantially as set forth.

5. The combination with the rotatable breech-block and cocking-head turning with and sliding longitudinally independently of the block, of a firing-head turning and sliding with, but sliding to a limited extent independently of, the cocking-head, and means for carrying back the cocking and firing heads on the rotation of the block in opening the gun, substantially as set forth.

6. The combination with the rotatable breech-block and cocking-head turning with, and sliding longitudinally independently of, the block, of a firing-head extending through the cocking-head and sliding inwardly thereof with but sliding independently thereof to a limited extent, and means for retracting the cocking-head as the breech is opened, substantially as set forth.

7. The combination with the rotatable breech-block and cocking-head turning with, and sliding longitudinally independently of, the block, of a firing-head extending through the cocking-head and sliding inwardly thereof with but sliding independently thereof, to a limited extent, means for retracting the cocking-head as the breech is opened, and a sear engaging the firing-head when retracted, substantially as set forth.

8. The combination with the rotatable breech-block, of a cocking-head, means for connecting it in different positions to turn with and slide independently of the block, two sets of stationary cams for independently engaging and carrying back the cocking-head when in its different positions, and a firing-head carried by the cocking-head, substantially as set forth.

9. The combination with the rotatable breech-block, of a cocking-head, means for

connecting it in different positions to turn with and slide independently of the block, two sets of stationary cams for independently engaging and carrying back the cocking-head when in its different positions, and a firing-head carried by the cocking-head but having a slight sliding movement independently of the latter, substantially as set forth.

10. The combination with the rotatable breech-block, of a cocking-head, means for connecting it in different positions to turn with and slide independently of the block, two sets of stationary cams for independently engaging and carrying back the cocking-head when in its different positions, a firing-head carried by the cocking-head but having a slight sliding movement independently of the latter, and a spring bearing on both the firing and cocking heads, substantially as set forth.

11. The combination with the breech-block, cocking-head supported to rotate and slide longitudinally, and cocking-cams, of a firing-head and its actuating-spring, the firing-head sliding inwardly with said cocking-head but sliding to a limited extent independently of the cocking-head when the latter is in its forward position, substantially as set forth.

12. The combination with the breech-block, cocking-head rotatable to two different positions, two sets of cams alternately arranged, one for percussion and the other for electric firing, of a firing-head and its actuating-spring, the firing-head sliding to a limited extent independently of the cocking-head when the latter is in its forward position, substantially as set forth.

13. The combination with the rotatable breech-block and sliding firing-head and its operating-spring, of a cocking-head adjustable to different positions in respect to the breech-block, and to two sets of operating-cams whereby the cocking-head is retracted to different degrees according to its different positions, substantially as set forth.

14. The combination with the carrier of a gun, the breech-block and recessed hub on said carrier, of a cocking-head sliding in said hub, two sets of cams carried by the hub, one for percussion and the other for electric firing, means for setting the cocking-head in position to be operated by either set of cams, and a firing-head carried by the cocking-head, substantially as set forth.

15. The combination with the carrier of a gun, the breech-block and recessed hub on the carrier, of a cocking-head sliding in said hub, two sets of cams carried by the hub, one for percussion and the other for electric firing, means for setting the cocking-head in position to be operated by either set of cams, and a firing-head carried by the cocking-head and having a limited movement independently of the cocking-head, substantially as set forth.

16. The combination with the carrier of a gun, the breech-block and recessed hub on the carrier, of a cocking-head sliding in said hub, two sets of cams carried by the hub, one
5 for percussion and the other for electric firing, means for setting the cocking-head in position to be operated by either set of cams, and a spring-actuated firing-head carried by the
10 cocking-head and having a limited movement independently of the cocking-head, substantially as set forth.

17. The combination of the carrier, its recessed hub, rotatable breech-block, cocking-head provided with pins adapted to different
15 openings in the breech-block, two sets of cams in the hub for engaging the cocking-head, one for percussion and the other for electric firing, and a firing-head carried by the cocking-head, substantially as set forth.

18. The combination of the carrier, its recessed hub, rotatable breech-block, cocking-head provided with pins adapted to different
20 openings in the breech-block, two sets of cams on the hub for engaging the cocking-head, one for percussion and the other for electric firing, a firing-head connected with the cocking-head, a spring bearing on the
25 cocking-head and on the hub, and a sear for holding the firing-head in retracted position, substantially as set forth.

19. The combination with the rotatable breech-block of a gun, of a firing-pin, its support or firing-head having shoulders thereon, a sliding cocking-head bearing upon said firing-head between said shoulders, means for
35 carrying back said cocking-head, and means for throwing said head inward, there being clearance between said cocking-head and said shoulders upon said firing-head whereby
40 said firing-head may have a limited move-

ment with relation to said cocking-head, substantially as set forth.

20. The combination with the carrier, rotatable breech-block, and cocking-head of a gun, of a firing-head carried by the cocking-head and means for moving the cocking-head
45 forward and back on turning the breech-block, the firing-head having a limited independent, longitudinal movement in the cocking-head, and a spring arranged to impart
50 the rearward movement to the firing-head in the cocking-head.

21. The combination with the carrier, rotatable breech-block, and cocking-head of a gun, of a firing-head carried by the cocking-head and means for moving the cocking-head
55 forward and back on turning the breech-block, the firing-head having a limited independent, longitudinal movement in the cocking-head, and a spring arranged to impart
60 the forward movement to the cocking-head and the rearward movement to the firing-head in the cocking-head.

22. The combination with the carrier, rotatable breech-block, and cocking-head of a gun, of a firing-head carried by the cocking-head and means for moving the cocking-head
65 forward and back on turning the breech-block, the firing-head having a limited independent, longitudinal movement in the cocking-head, and a spring arranged to normally
70 hold the firing-head in its rear position in respect to the cocking-head.

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

SIGARD A. S. HAMMAR.

Witnesses:

LEIGHTON N. D. MIXSELL,
EDWIN A. MILLER.