

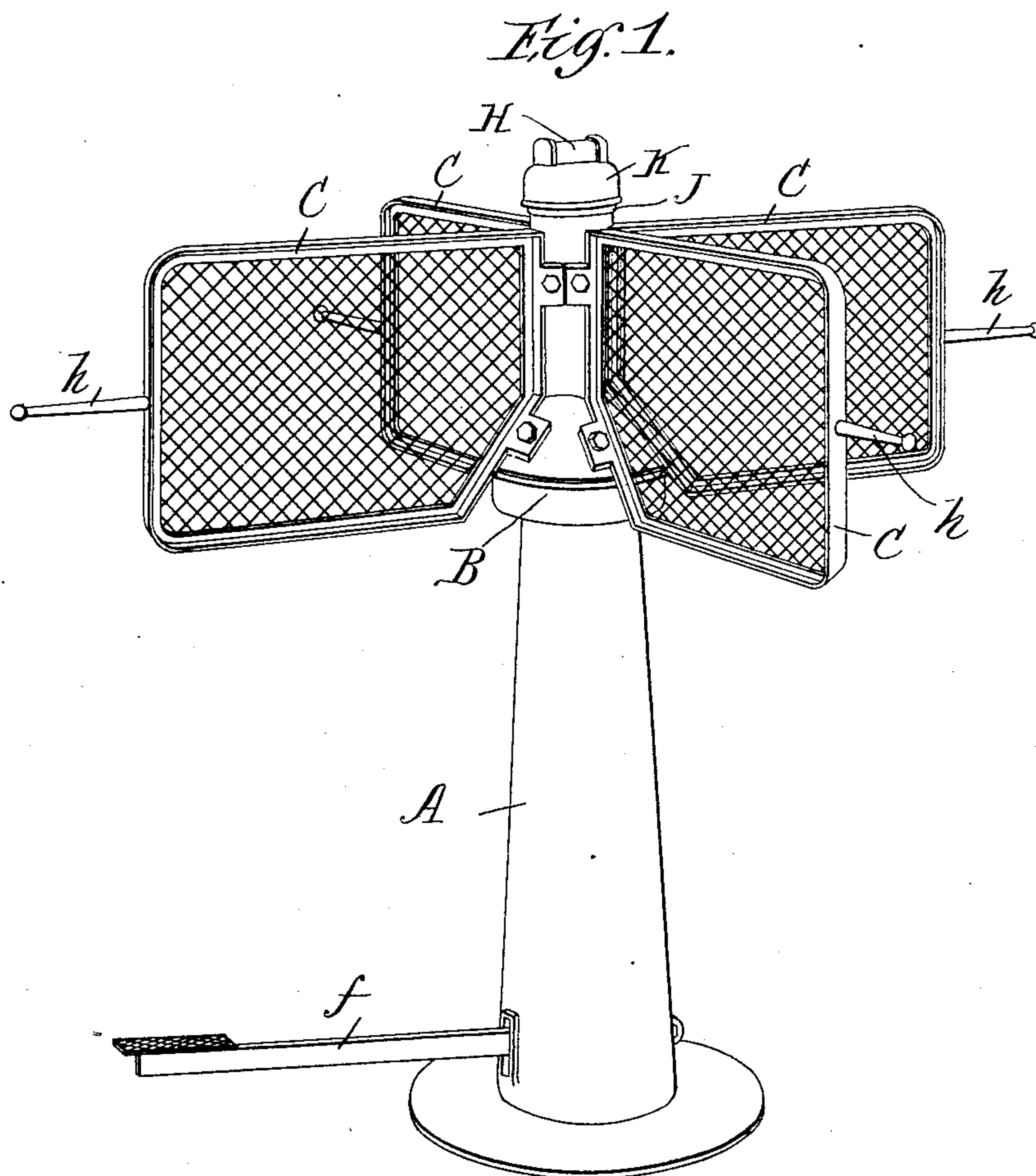
(No Model.)

4 Sheets—Sheet 1.

O. H. WILLIAMS.
TURNSTILE.

No. 560,386.

Patented May 19, 1896.



Witnesses.

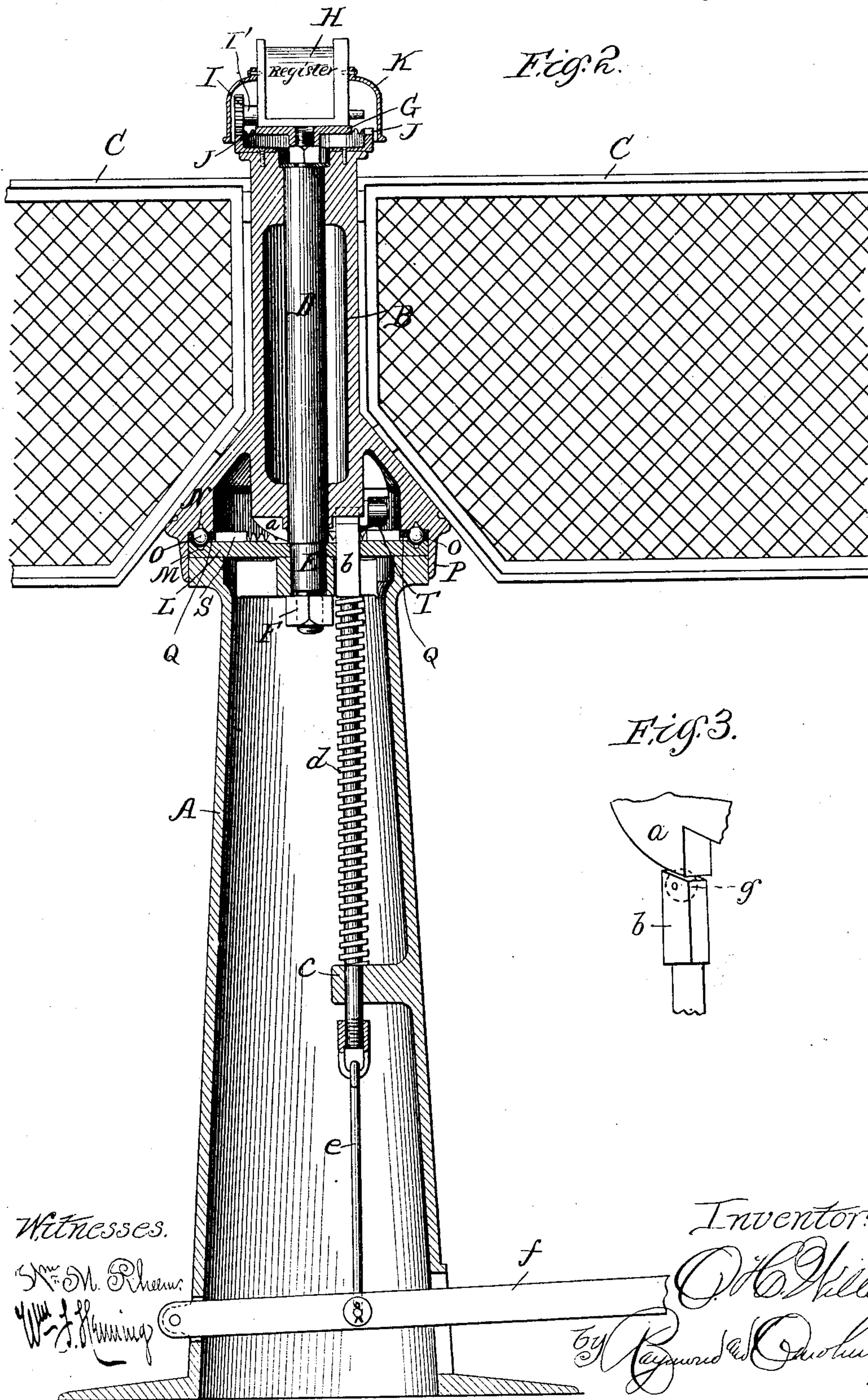
Wm. M. Rheem
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Inventor:
O. H. Williams
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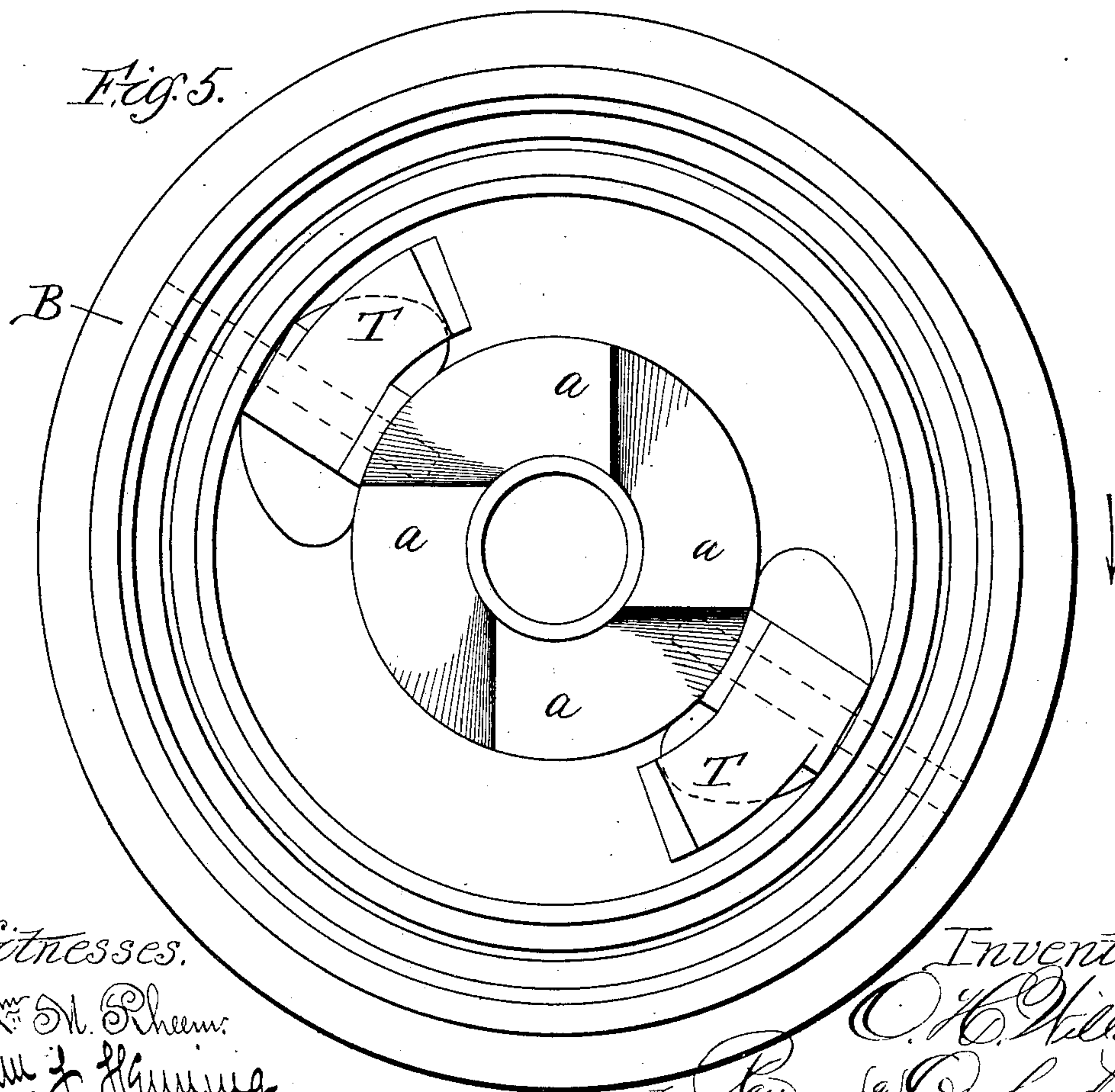
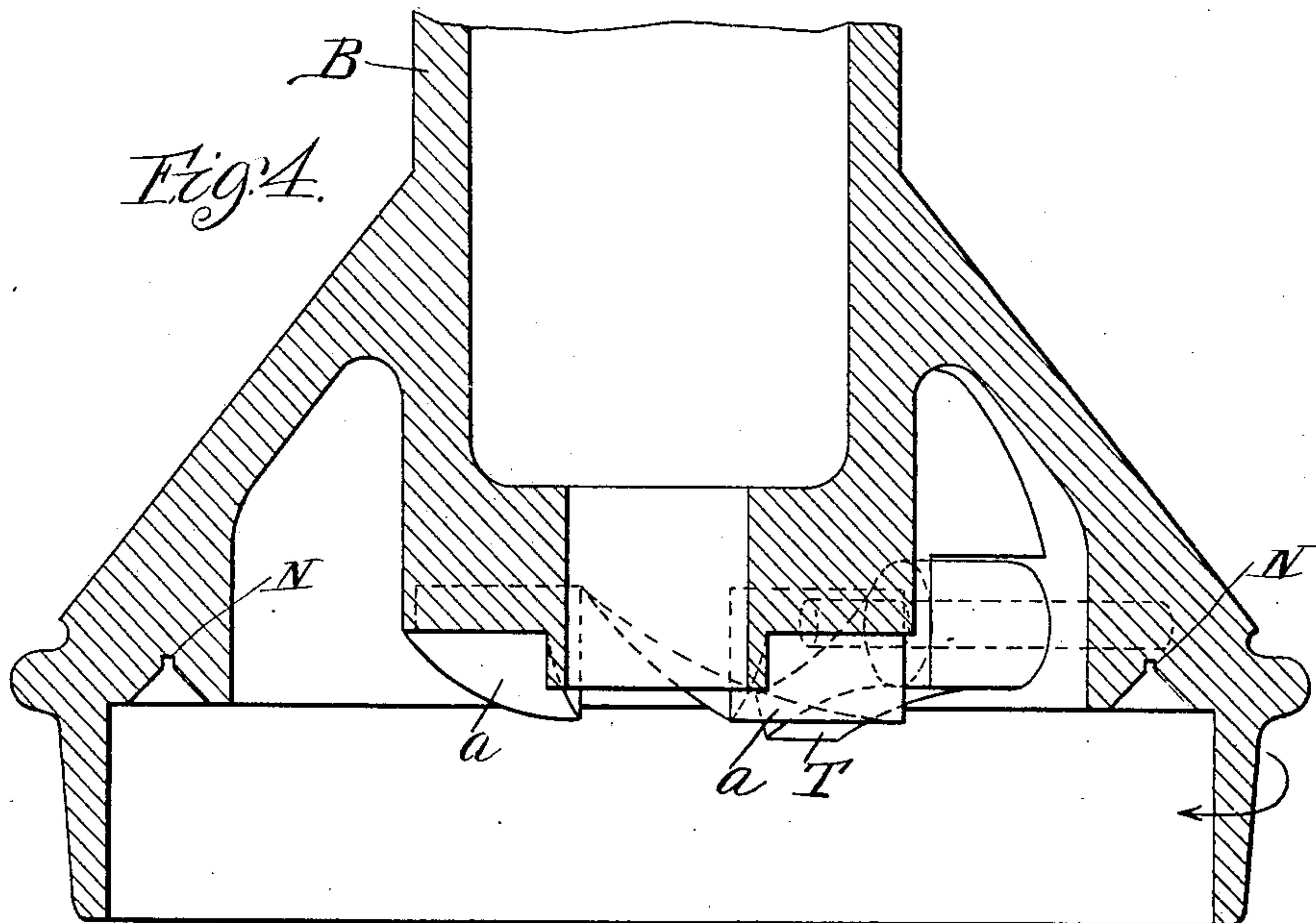
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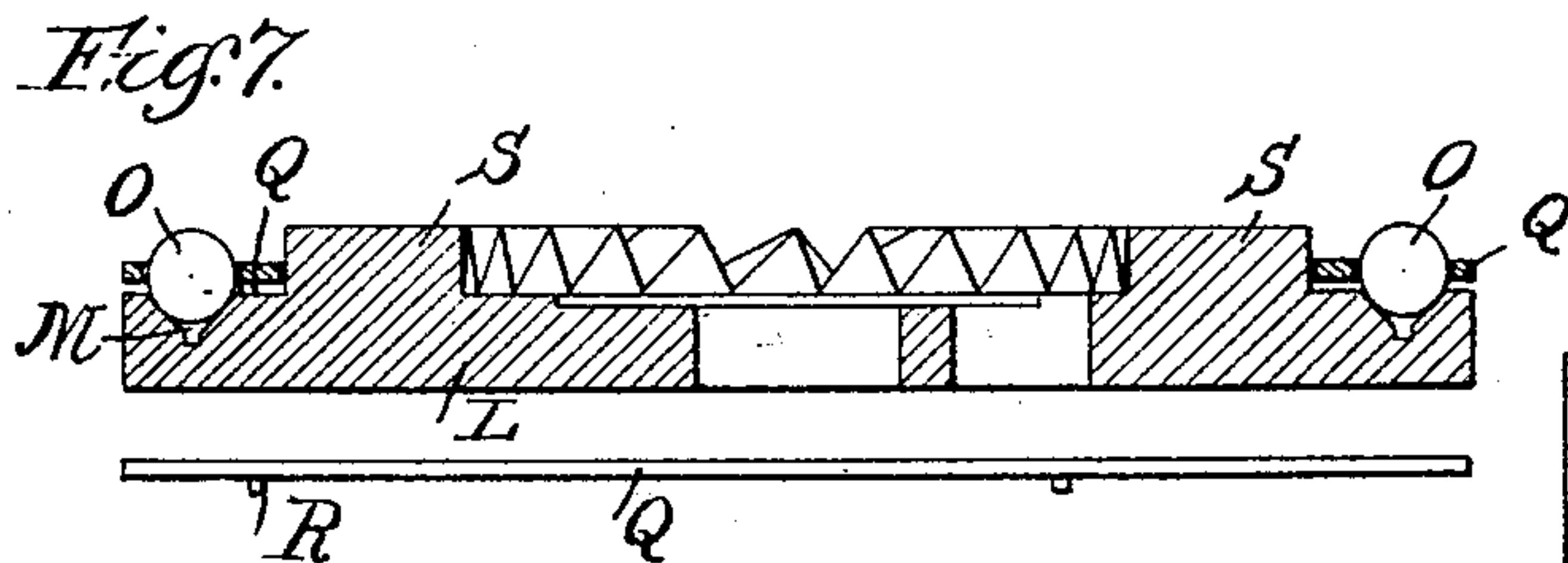
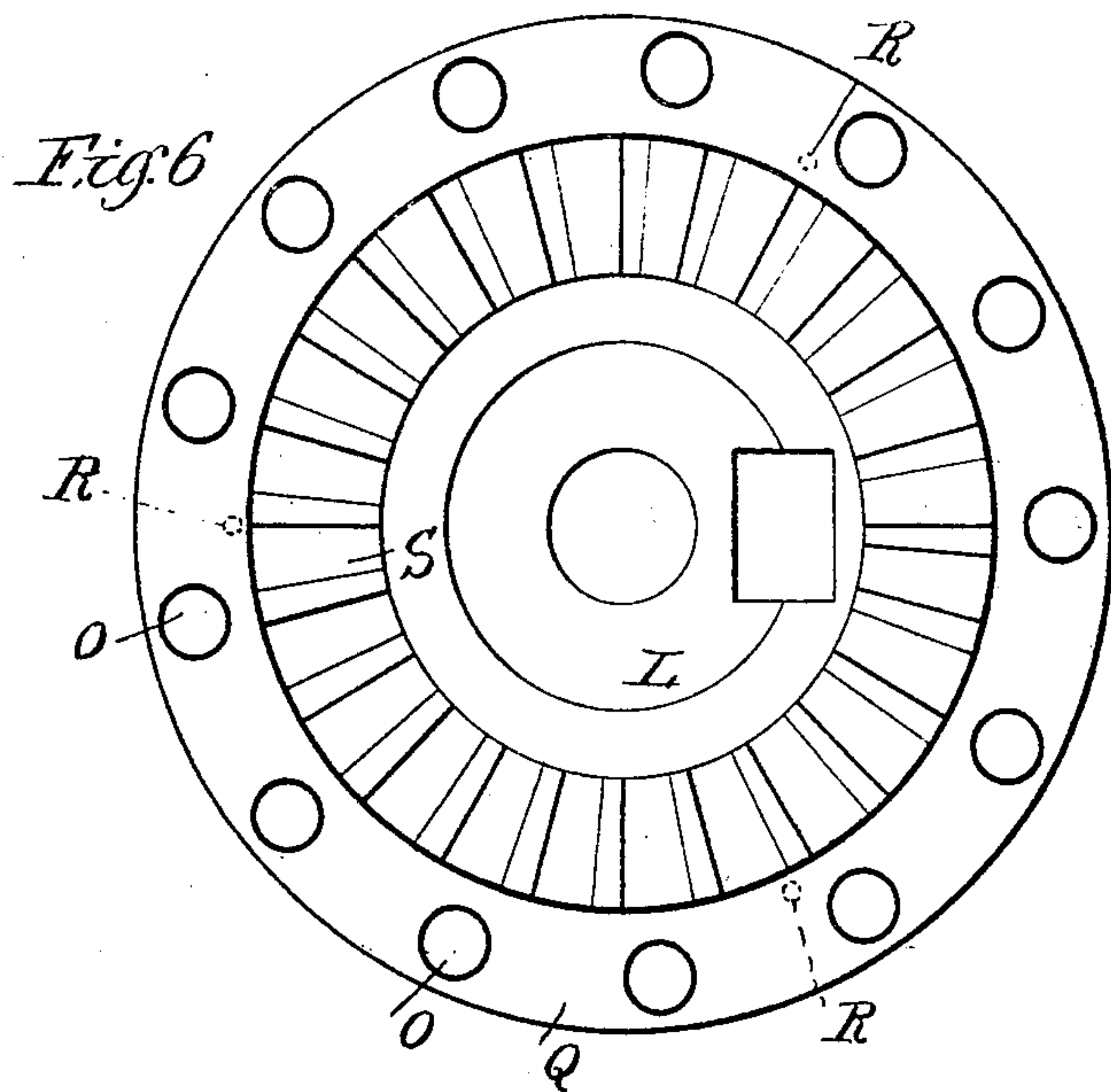


Fig. 8.

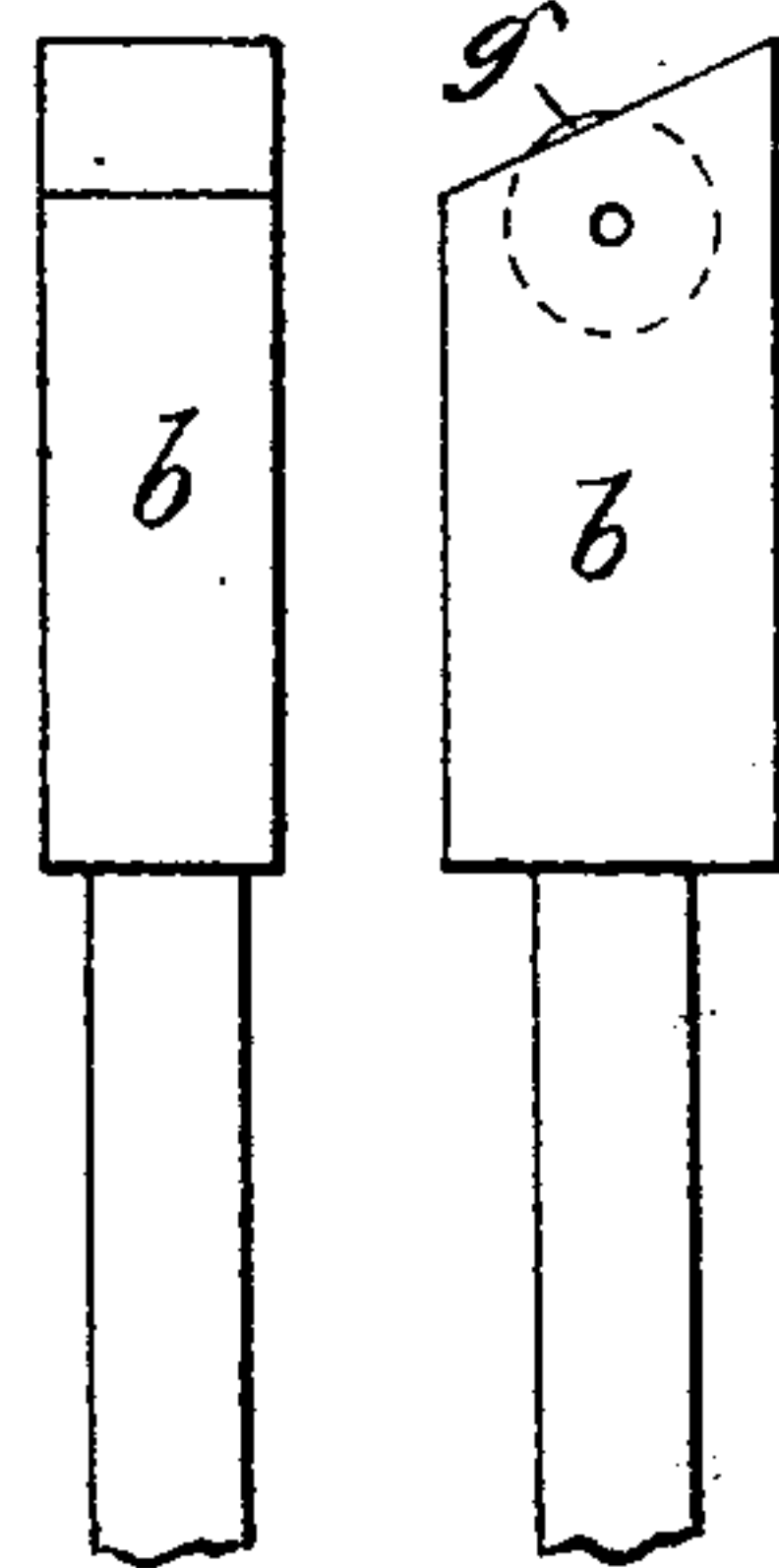
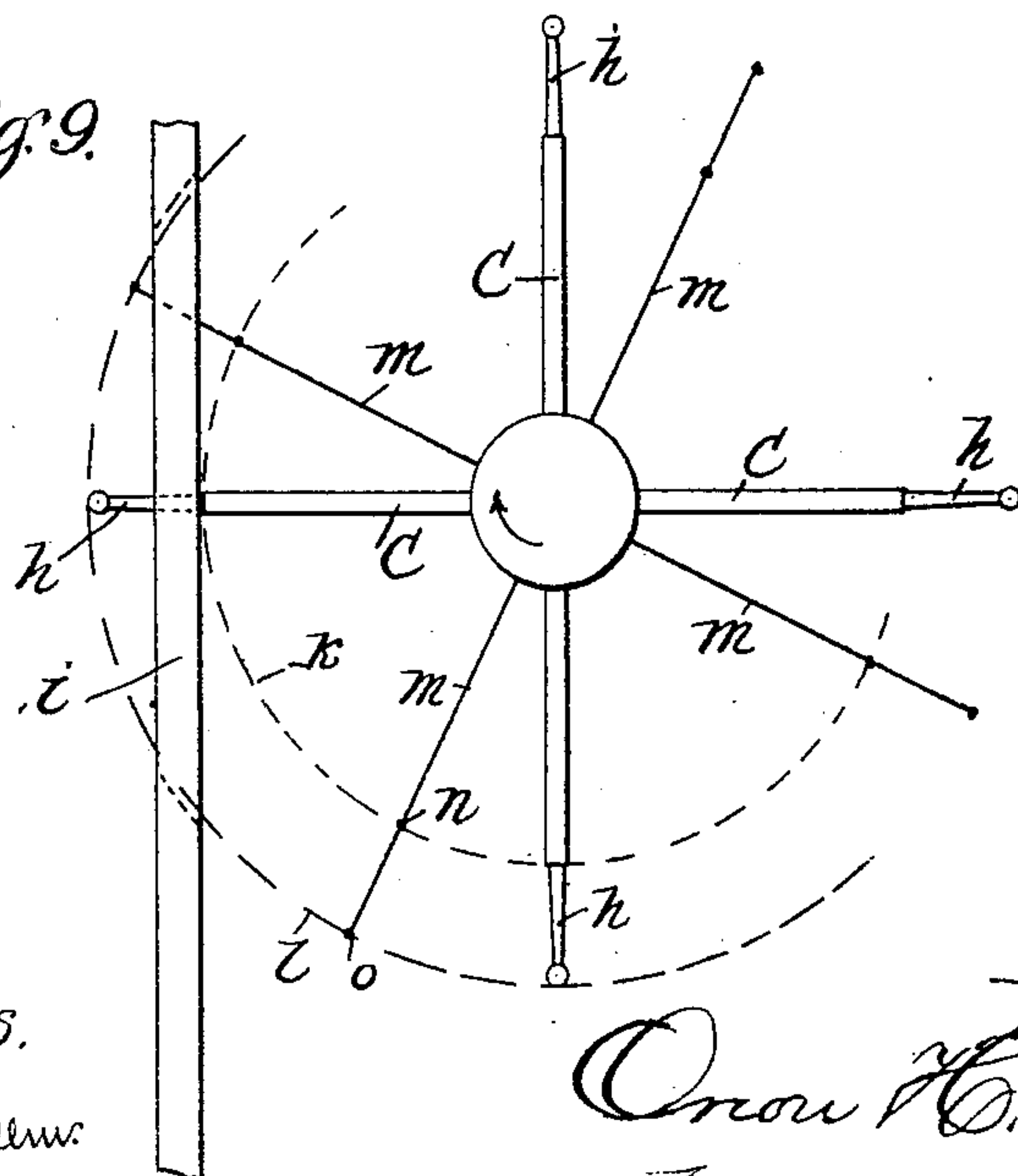


Fig. 9.



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UNITED STATES PATENT OFFICE.

ORION H. WILLIAMS, OF CHICAGO, ILLINOIS.

TURNSTILE.

SPECIFICATION forming part of Letters Patent No. 560,386, dated May 19, 1896.

Application filed December 7, 1894. Serial No. 531,166. (No model.)

To all whom it may concern:

Be it known that I, ORION H. WILLIAMS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Turnstiles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

10 This invention relates to improvements in turnstiles, and more particularly in that class known as "registering-turnstiles," in which each partial rotation of the turnstile sufficient to permit the passage of a person is registered.

15 This invention has among its objects to simplify and cheapen the construction of the turnstile as a whole, and not only reduce the number of parts heretofore necessary but also to have the same of compact and durable form and so arranged and disposed as to be safe from tampering.

Another object is to have the turnstile automatically and intermittently rotatable by the locking device, whereby when the turn-
25 stile is released by the operator for the passage of a person the turnstile will automatically make a partial rotation and stop without the assistance of either the operator or the person passing through the turnstile.

30 A further object is to have the register-actuating mechanism of such character that the registering devices will be positively and directly actuated by the turnstile, while so concealed and incased as to prevent the possibility of tampering therewith.

A still further object is to have a turnstile so constructed and so related to the opposite side of the passage controlled thereby that but a single person can get between the wings
40 of the turnstile and pass through on a single partial rotation of the turnstile, whereby the fraudulent admission of more than one person for a single admission-fee is prevented.

These and such other objects as may here-
45 inafter appear are attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view of a turnstile embodying my invention. Fig. 2
50 represents a central vertical section thereof;

Fig. 3, a diagrammatic view of a portion of the locking devices. Fig. 4 is an enlarged central section through the lower portion of the wing-carrying hub; Fig. 5, an inverted plan view thereof; Fig. 6, a detail plan view
55 of the stop-rack and antifrictional devices; Fig. 7, a transverse vertical section thereof; Fig. 8, detail views of the locking-bolt, and Fig. 9 a diagrammatic view showing the relation of the turnstile to the passage-way. 60

The same letters of reference indicate the same or like parts in the several views of the drawings.

Referring by letter to the accompanying drawings, A indicates the stationary pillar or
65 supporting-standard, adapted to rest upon the floor or ground; B, a rotating vertical hub, supported at its lower end upon the pillar, and C the wings, of any desired number, but preferably four, which are secured to
70 and radiate from the hub. These general features are common to all turnstiles of this class.

Extending axially and loosely through the hub is a fixed spindle D, the lower end of
75 which is rigidly secured in any suitable manner, a convenient form of which is shown in the drawings, which consists in passing a reduced portion E of the spindle through the head of the pillar, so as to leave a shoulder
80 resting upon the pillar-head with the end of the spindle protruding through the head, and provided with a tightening-nut F, between which and the shoulder the pillar-head is clamped, thereby holding the spindle rigidly
85 in position. On the upper end of the spindle, which projects beyond the hub B, is rigidly secured a disk or plate G, upon which is mounted and rigidly secured a register H of any suitable or desired construction, and as the de-
90 tails of construction or mode of operation of the register forms no part of this invention, excepting as to the main or power shaft I' thereof, I have not deemed it necessary to herein illustrate and describe in detail any
95 form of register, but simply show the casing for containing the operative mechanism thereof, which, as before stated, may be of any suitable character. Upon the power or
100 main drive-shaft I' of the register is mounted

a pinion I, adapted and arranged to mesh with and be driven by an annular rack J, formed upon or preferably rigidly secured to the upper end of the hub B, so that when the hub is rotated the annular rack will cause a corresponding rotation of the pinion I and thereby actuate the registering mechanism within the register so as to register any partial turn of the turnstile that indicates the passage of a person, in a manner that is obvious.

To the casing of the register is riveted or otherwise rigidly secured an apron or shield K, which falls below the annular gearing on the hub, and thus not only covers and protects such mechanism as against the lodgment of dirt and other foreign substances, but also effectually conceals and protects the mechanism of the register as against tampering therewith by the operator for fraudulent purposes.

By the foregoing construction I provide a positive and direct connection between the rotating hub and the power-shaft of the register and dispense with the intervening gears, which have heretofore been found necessary in devices of this class, thereby greatly simplifying the construction of the same, insuring certain and positive action of the register, and also avoiding the uncertainty as to registration which arises in the use of intermediate gearing, and especially where there is opportunity for lateral play of the parts after the machine has been in service some time. The protecting-apron K, as well as the casing of the register, may also be given a highly-ornamental finish, if desired, so as to greatly improve the appearance of the turnstile.

To facilitate the easy turning of the gate, I interpose between the pillar A and the hub B an antifriction device, preferably consisting of a disk-like plate L, rigidly secured to the head of the pillar and provided near its outer edge in the upper face thereof with an annular groove M, which finds its counterpart N in the lower face of the hub, in which grooves run a series of antifriction-balls O. The lower end of the hub is provided with a depending flange P, which extends below the plate L, closely surrounding the head of the pillar, so as to prevent the lodgment of dirt and other foreign substances in the grooves and at the same time assist in relieving the spindle D of lateral strain in case vertical pressure be brought to bear upon one of the wings. The antifriction-balls are separated and mounted in fixed relation by a loose flat ring Q, lying between the plate L and the end of the hub, which ring is provided with a series of circular openings (see Fig. 6) corresponding in number to and complementary of the antifriction-balls, and it is mounted in position at the horizontal axis of the balls by means of a series of short pins R on the lower face thereof, which rest and travel upon the upper face of the plate L. As the hub rotates, the antifriction-

balls are of course compelled to run around or traverse the grooves in the plate L and the hub, and as the balls are located in the holes in the ring Q of course said ring must also travel with the balls—that is, it rotates upon an axis common to the hub.

Just inside of the grooves M the plate L is provided on its upper face with an annular or circular toothed rack S, with which engages one or more dogs T, pivotally secured to the hub B. This rack and the dogs form in effect a pawl-and-ratchet connection between the pillar and the hub, so as to prevent reverse rotation of the hub, and it is obvious that the dog or dogs may be actuated by gravity or springs.

In the center of the lower end of the hub over the area of the plate L within the annular rack S is formed or rigidly attached a series of cams or inclines *a*, corresponding in position and number with the wings of the hub and inclined in a direction reverse to the ratchet-teeth S. With these cams or inclines engages a spring-actuated locking-bolt *b*, (see Fig. 2,) located and working within the pillar A and through the plate L, which latter serves as one guide for the bolt, while the other guide is furnished by a projection *c* in the interior of the pillar, between which and a shoulder upon the bolt is confined a coiled spring *d*, which normally tends to project the bolt into engagement with the cams or inclines. This bolt may be operated to release it from the cams in any suitable manner, as by means of the link *e*, pivotally connecting the bolt with a foot-lever *f*, although obviously a hand-lever or any other device may be employed for withdrawing the locking-bolt. This bolt engages the shoulder formed by each cam or incline and prevents the rotation of the gate in the forward direction to admit a person, while the pawl-and-ratchet connection between the hub and pillar, before described, serves to prevent rotation of the gate in the opposite direction.

Whenever it is desired to permit the passage of a person through the gate or turnstile, the operator may depress the locking-bolt, so as to disengage it from one of the cams or inclines *a*, when the gate is free to turn; but if the operator has in the meantime released the locking-bolt it will ride down the cam or incline until it strikes the shoulder formed by the next one, when the gate will be again locked. Now I propose to take advantage of this arrangement to automatically rotate the turnstile in the direction in which the person is moving without any assistance from either such person or the operator, although such assistance would not in the least interfere with the operation of the gate. To this end I bevel or incline the upper face of the locking-bolt, as more clearly shown in Fig. 8, and put such curvature or incline upon the cams *a* and provide a spring *d* of such strength that when the operator releases the locking-bolt after

starting the gate the pressure of the locking-bolt upon the cams a will cause the turnstile to automatically turn and stop at the end of each partial revolution, or if the operator so desires by watching the position of the wings he can repeat this action successively and keep up a constant rotation of the gate without again touching the gate; but whenever he ceases manipulation of the locking-bolt the gate will automatically stop. To lessen the friction between the locking-bolt and the cams or inclines an antifriction-roller g (shown by dotted lines in Figs. 3 and 8) may be mounted in the end of the locking-bolt so as to protrude slightly beyond the inclined face thereof and thus sustain the thrust of the bolt on the cam, thereby reducing the friction between these parts to the minimum and rendering the action of the gate more sensitive and effectual. It is to be understood, however, that it is not my purpose to have the gate revolve with any considerable speed, certainly not in excess of the speed at which a person would ordinarily walk through the gate, the principal desire being to relieve both the operator and the person passing through the gate of the present necessity of pushing the gate all the way around, as my gate, when once started, will simply follow the person passing through, and with not sufficient force to inconvenience the person in the least. Of course if the person were to pass very quickly through the gate this feature would not come into play; but at the same time the operation of the gate would not in the least be affected, and the gate would come to a stop just the same as if it were operating under the influence of the spring-actuated locking-bolt.

A common source of fraud in the use of turnstiles is the allowance by the gateman or operator of two persons between a single pair of wings, so that the two may pass through the turnstile while it registers for but one, the gate-keeper in this way either favoring friends or defrauding his employers. To prevent this I propose to provide each of the wings with an extension, which is preferably in the shape of arms h , attached to each wing and extending beyond the main body thereof, which arms work through slots in or between the rails of the side i (see Fig. 9) of the passage opposite the gate. In this way by the time one person gets between the wings and has moved them sufficient to allow another person in under ordinary conditions the projecting arm has so narrowed the space between the gate and the opposite side of the passage that another person cannot squeeze into the space. This is best illustrated in the diagram view, Fig. 9, in which the inner dotted segment of a circle k describes the radius of the wing proper and the outer dotted segment l describes the radius of the extension.

Without the extension when the gate has moved to the position shown by the lines m the end of the wing would be at the point n ,

leaving the space represented by the distance between the point n and the side wall i , which would be sufficient to permit a person to pass through and get in between the wings with the other person; but with the extensions h on the wings the end thereof would be at the point o and the space left would be only about two-thirds of what it would be without such extensions and is too small to admit of the passage of another person. This is an exceedingly simple way in which to accomplish a very important and desirable result, a result imposed as a practical necessity to the commercial success of a turnstile when used at the gates of railway-stations, expositions, and like places, where the people pass in considerable numbers and generally in a hurry.

What I claim, and desire to secure by Letters Patent, is—

1. In a turnstile, the combination with a pillar, of a fixed spindle, a rotating hub adapted to move about said spindle, the roller-bearings interposed between said hub and pillar, the ratchet-faced disk between said pillar and hub, the gravity-pawls adapted to prevent backward rotation, and the spring-actuated locking-bolt located within the pillar, and the foot-lever for operating the same, substantially as shown and described.

2. In a turnstile, the combination with a fixed spindle, of a rotating hub mounted thereon, the wings fixed to said hub, an annular rack-bar mounted upon the top of the hub, the register mounted upon the top of the spindle, the horizontal shaft thereof carrying the pinion which meshes with the annular rack-bar, and the hood attached to the register to protect the pin and rack-bar and still permit the hub and wings to rotate, substantially as shown and described.

3. In a turnstile, the combination with the side walls or rails, of the rotating wings having extensions, said extensions passing beyond the said walls or rails and the ends of the wings extending to said side walls or rails, substantially as shown and described.

4. The combination with a turnstile comprising a pillar and a rotary hub supported thereon, the opposing faces of said pillar and hub having annular grooves therein, of a series of balls located in said grooves, an annular spacing-ring having a series of perforations corresponding in number with, and complementary to, said balls which work in said openings, and centering-pins supporting said ring upon the end of the pillar with freedom to rotate, substantially as described.

5. The combination with a turnstile, comprising a stationary pillar, a rotary hub supported thereon, and wings radiating from said hub, of a disk-like plate secured to the pillar-head, a series of antifriction-balls interposed between said plate and the hub, and working in annular grooves therein, an annular rack upon said plate of less diameter

than the grooves, a dog or dogs carried by
the hub and engaging said rack, a series of
cams or inclines corresponding in number
with said wings, and opposing the area of the
5 plate within said annular rack, and a spring-
actuated locking-bolt, working through said
plate and adapted and arranged to impinge

against said cams or inclines, so as to impart
rotary motion to the hub, substantially as de-
scribed.

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Witnesses:

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