

(No Model.)

2 Sheets—Sheet 1.

H. BEARD.

REGISTER OR COUNTER FOR MACHINES, STEAM ENGINES, PUMPS, &c.

No. 329,996.

Patented Nov. 10, 1885.

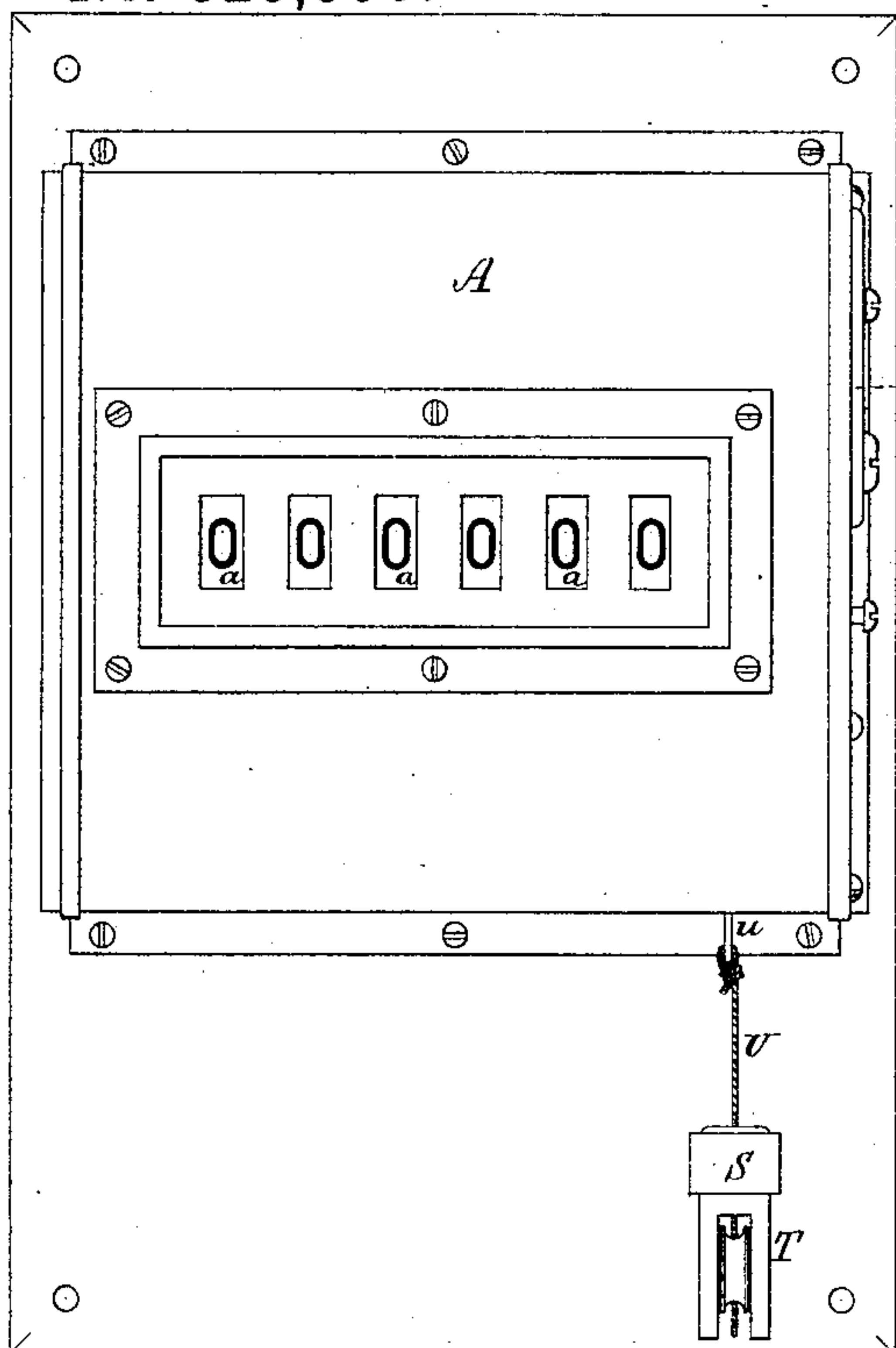


Fig. 1.

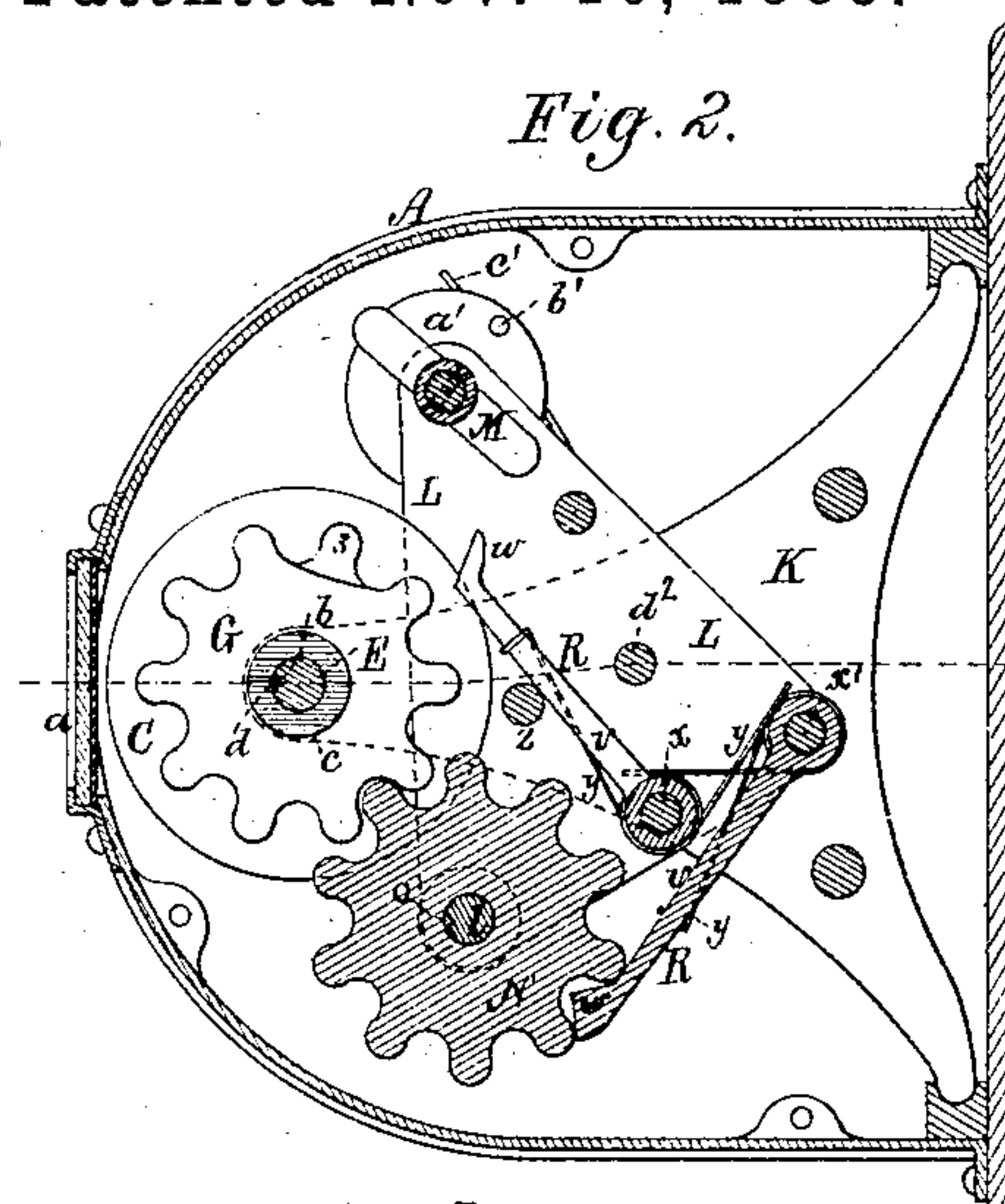


Fig. 2.

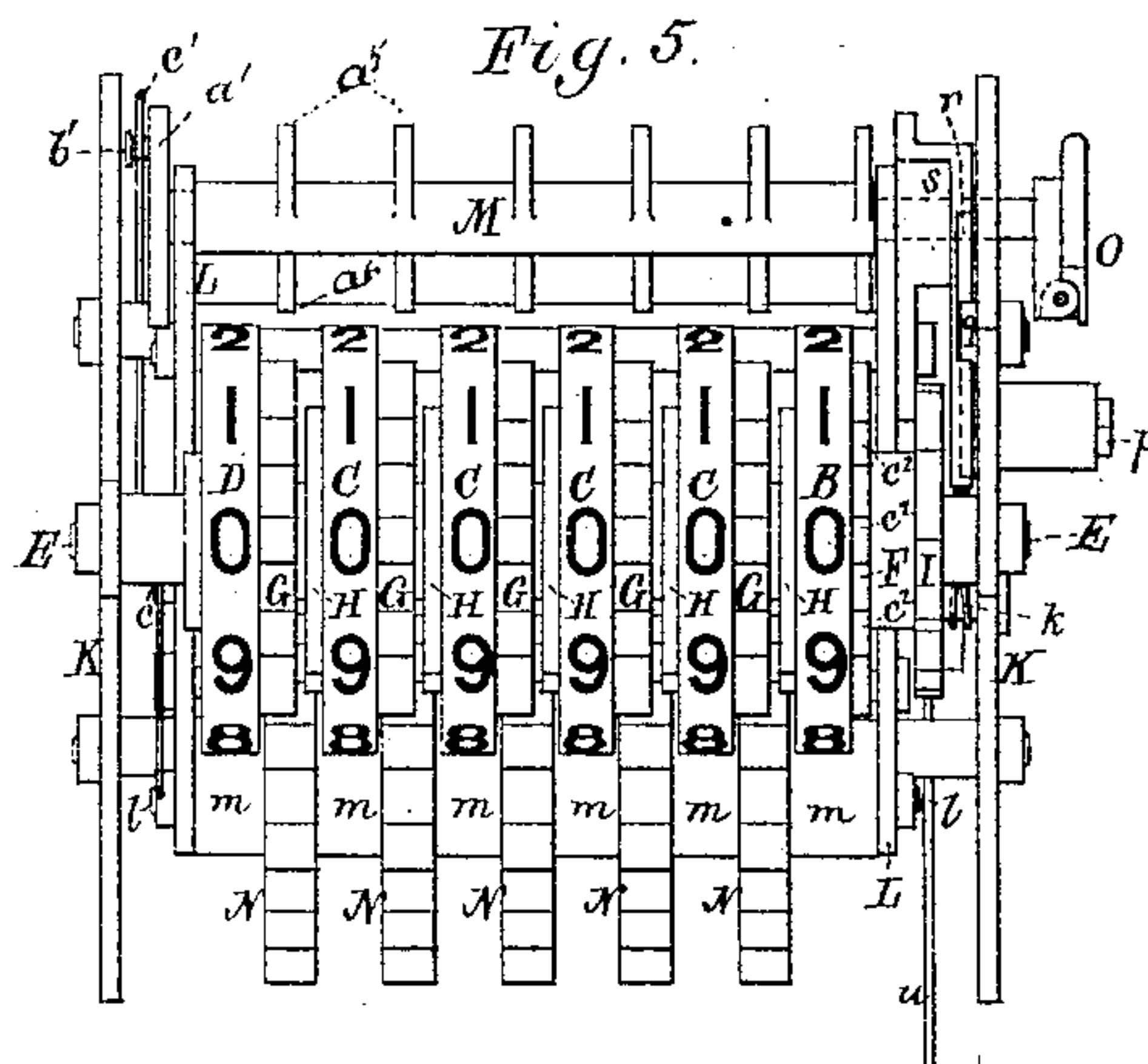


Fig. 5.

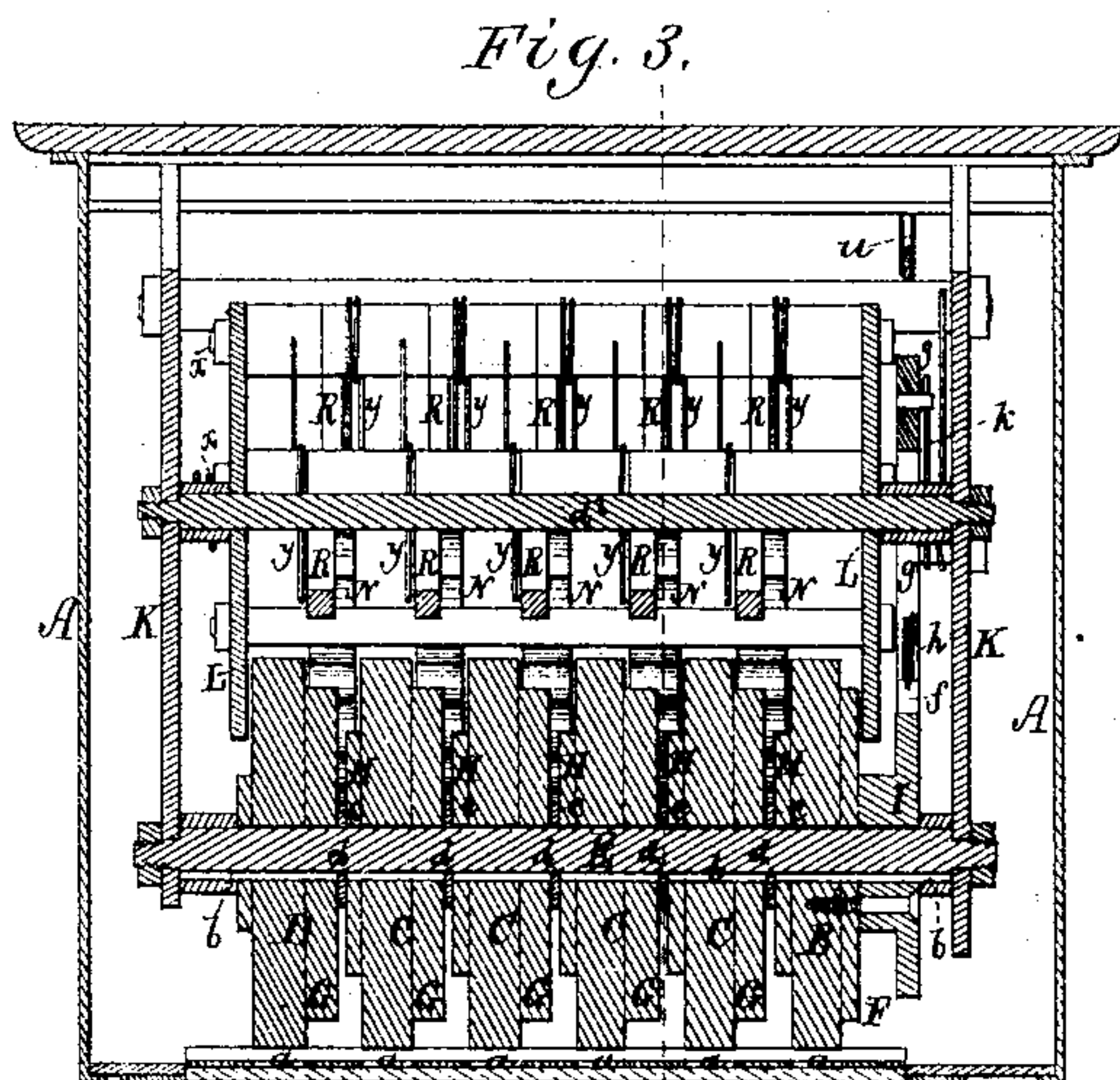


Fig. 3.

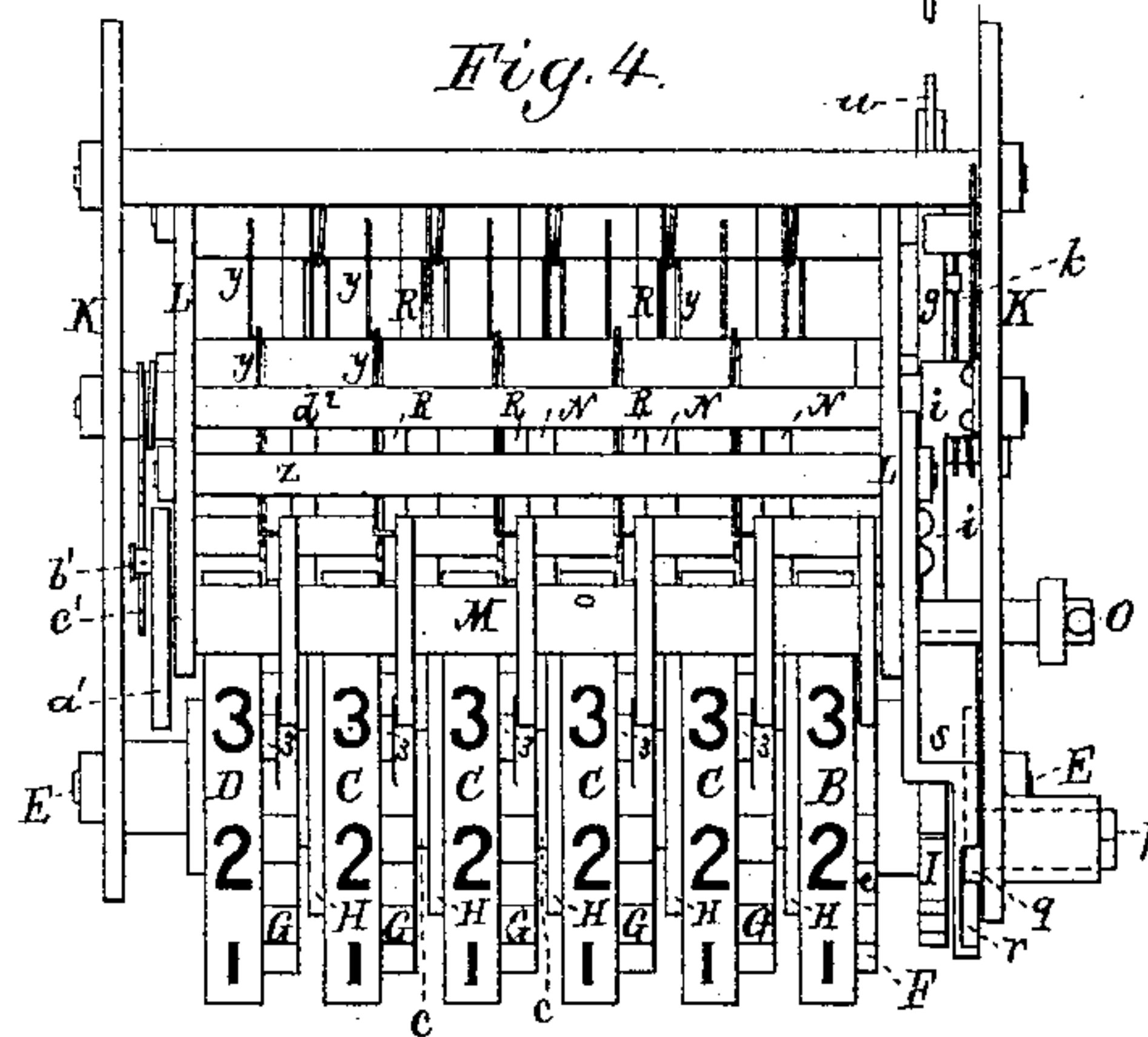


Fig. 4.

Witnesses.
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Horace Beard,
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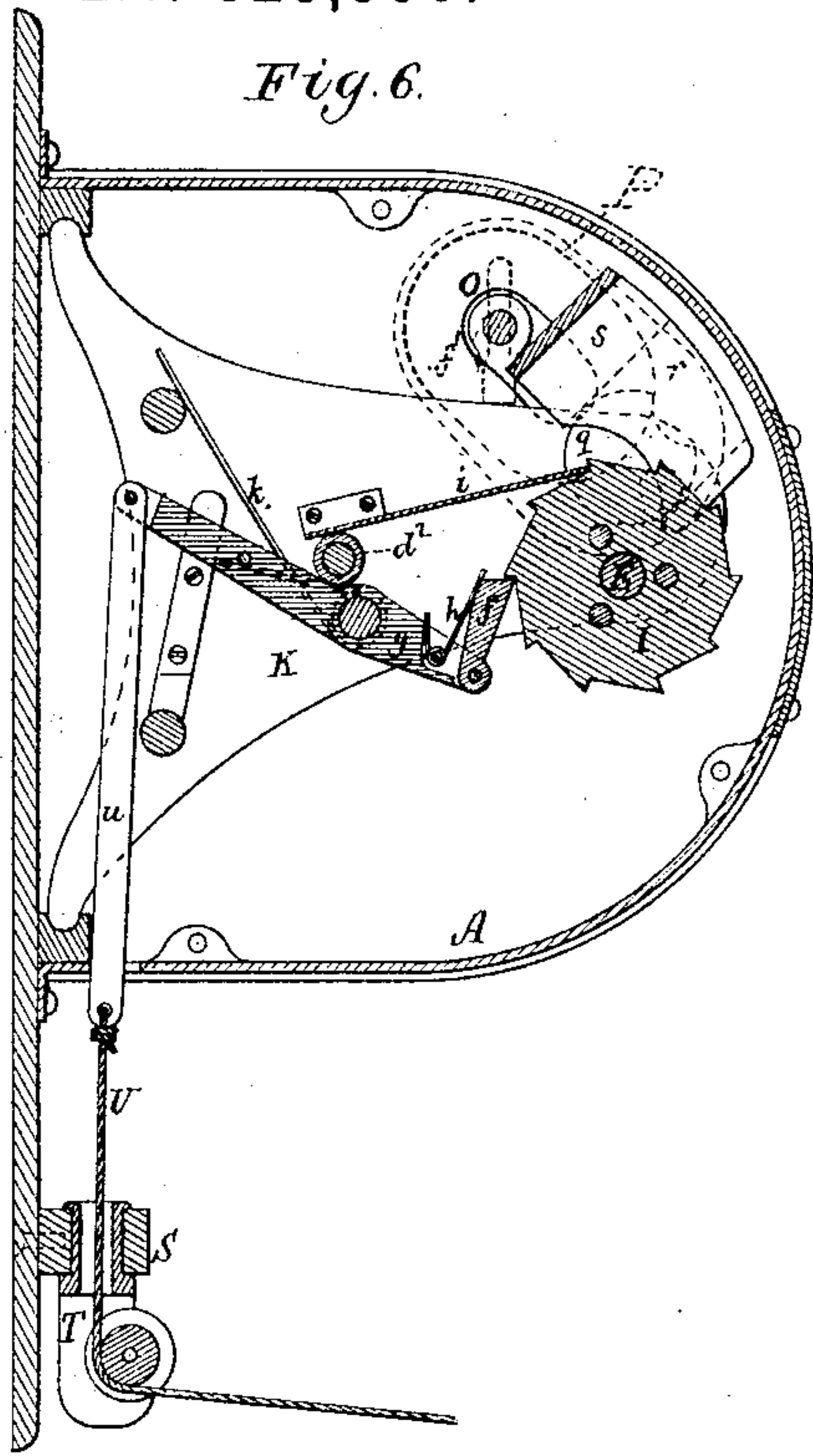


Fig. 13.



Fig. 15.

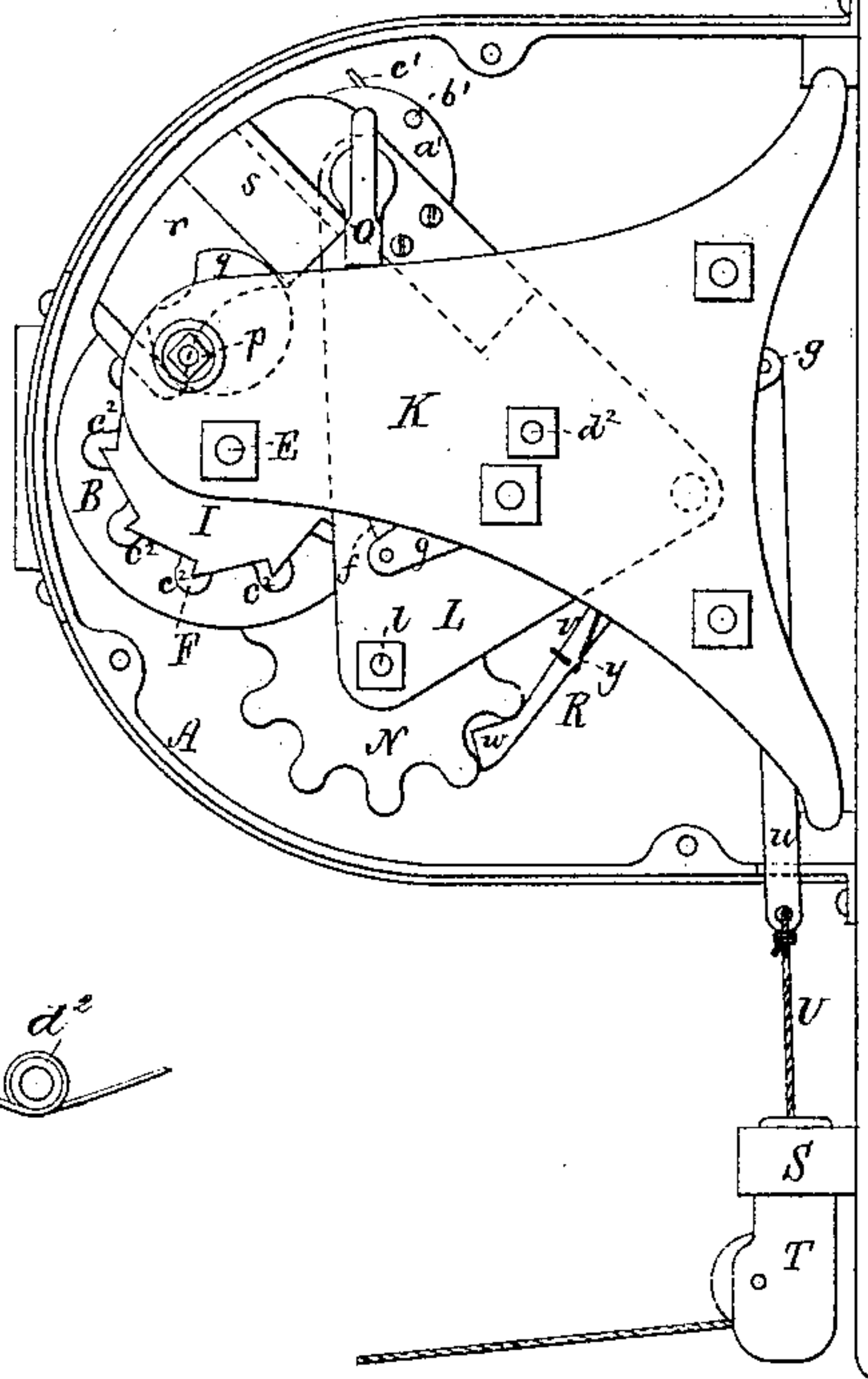


Fig. 14.

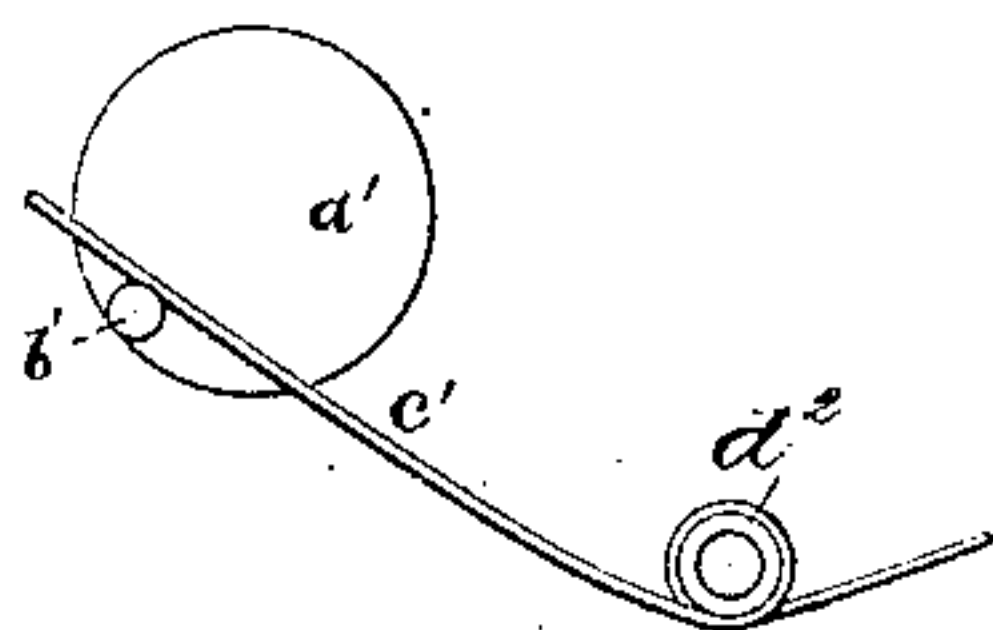


Fig. 7.

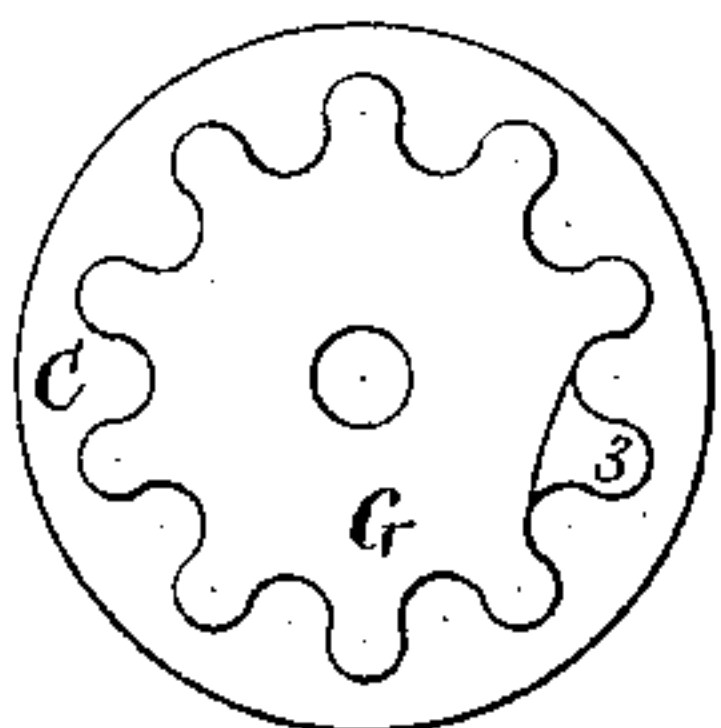


Fig. 9.

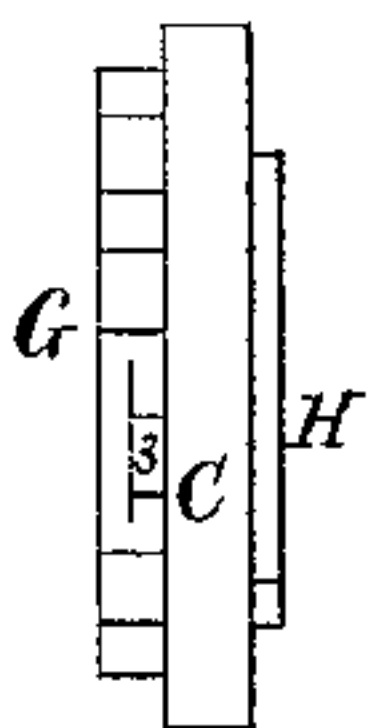


Fig. 8.

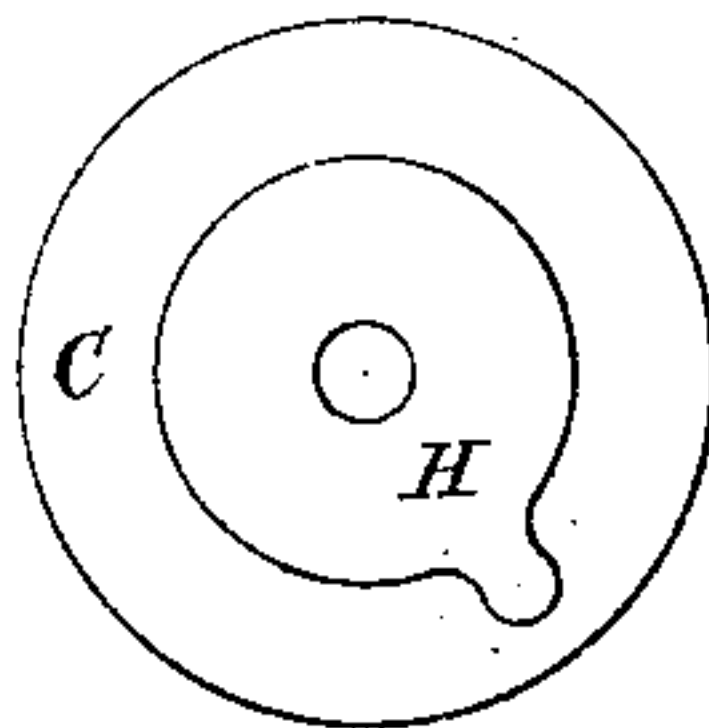


Fig. 10.

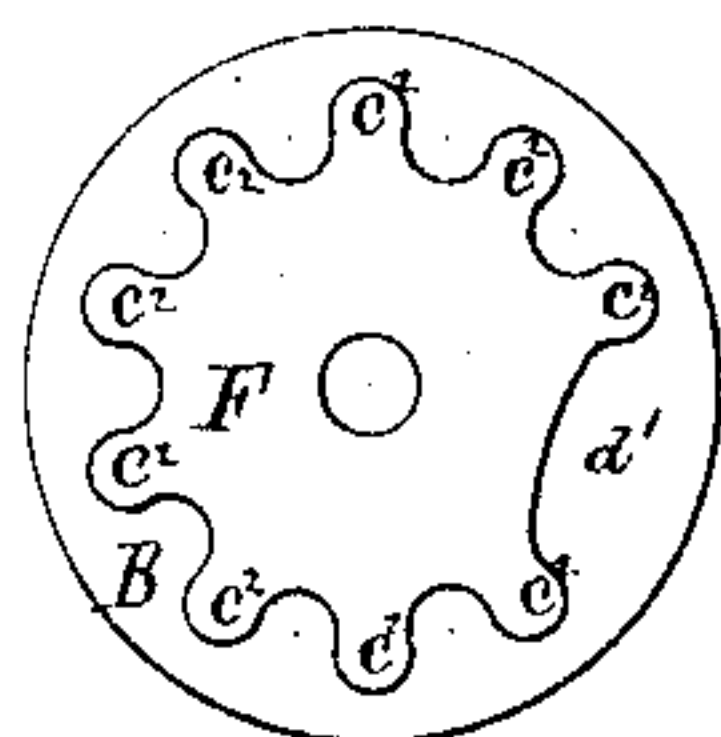


Fig. 11.

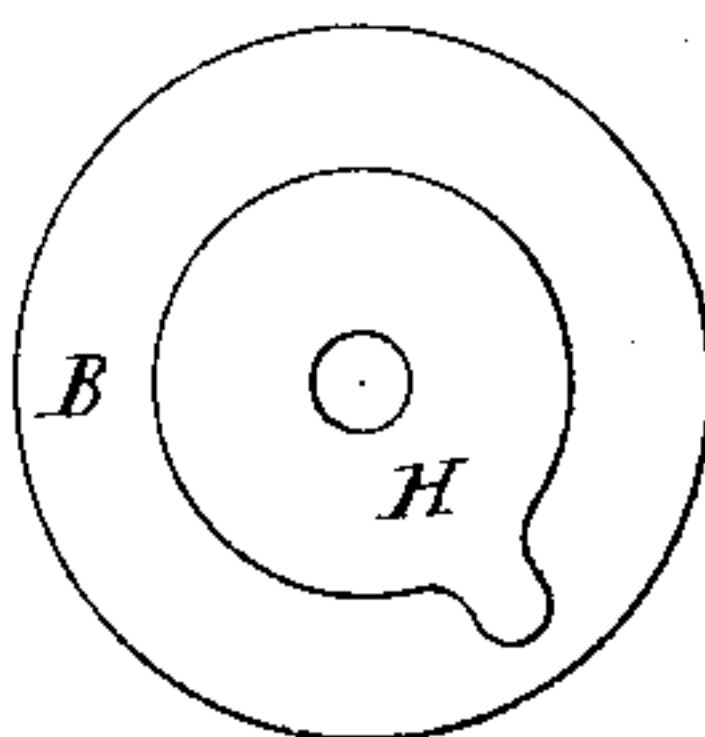
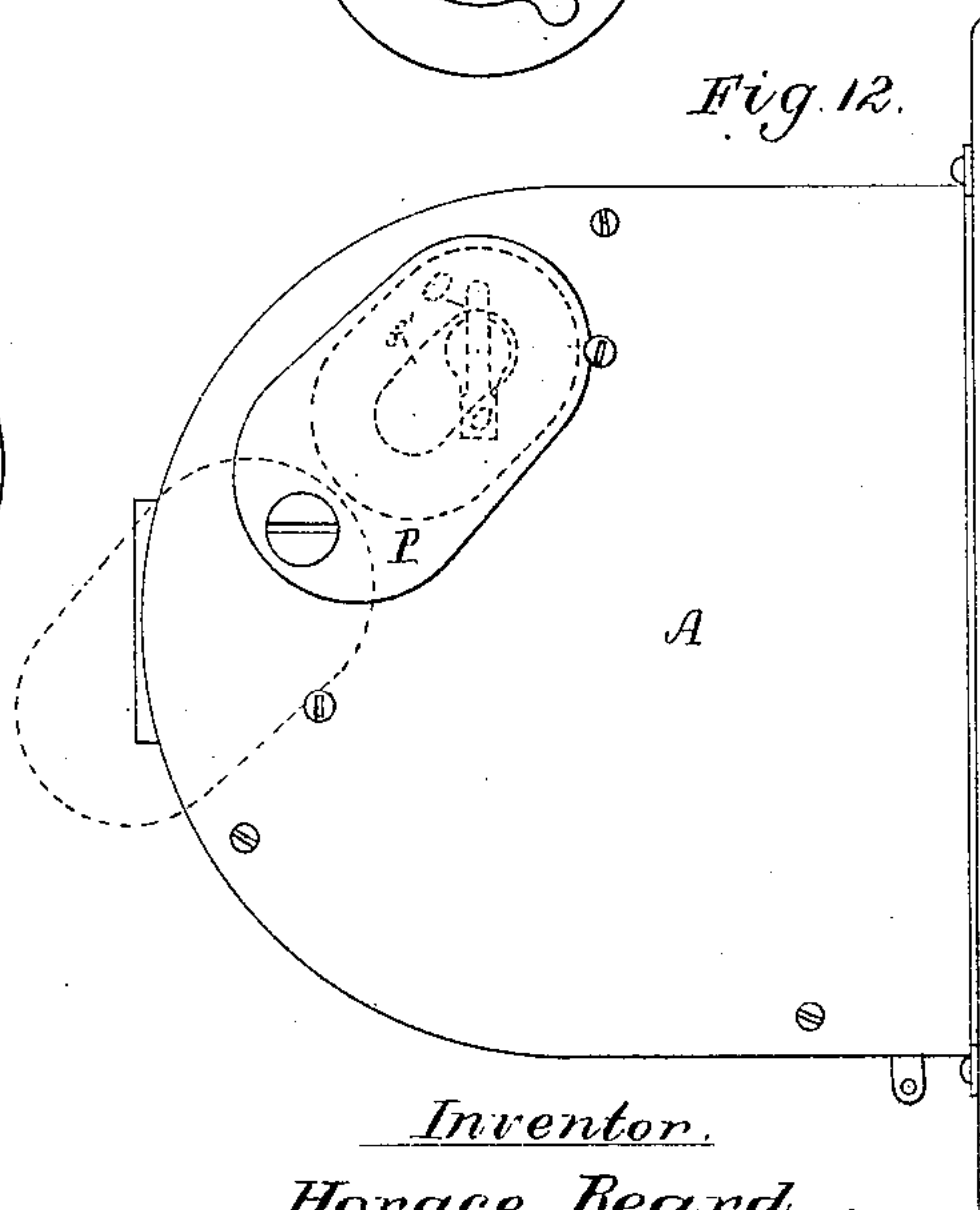


Fig. 12.



Witnesses.
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UNITED STATES PATENT OFFICE.

HORACE BEARD, OF WILTON, NEW HAMPSHIRE.

REGISTER OR COUNTER FOR MACHINES, STEAM-ENGINES, PUMPS, &c.

SPECIFICATION forming part of Letters Patent No. 329,996, dated November 10, 1885.

Application filed November 28, 1884. Serial No. 149,004. (No model.)

To all whom it may concern:

Be it known that I, HORACE BEARD, of Wilton, in the county of Hillsborough and State of New Hampshire, have invented a new and useful Improvement in Registers or Counting-Machines; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

10 Figure 1 is a front elevation; Fig. 2, a vertical and longitudinal section; and Fig. 3 a transverse and horizontal section of a register or counting-machine containing my invention, the nature of which is defined in the claims hereinafter presented. Fig. 4 is a top view, and Fig. 5 a front elevation of the mechanism contained within the case of the register or counting-machine. Fig. 6 is a vertical section taken through the ratchet-wheel of the first counting-wheel, said section showing the mechanism for operating said ratchet-wheel. Figs. 7 and 8 are opposite side views; and Fig. 9 is a top view of any one of the counting-wheels, except the first one and the last one of the series. The said last one, although having on one side of it a gear, as hereinafter described, having several teeth, has no single-toothed gear on its opposite side, as is the case with each of the other wheels of the series. Figs. 10 and 11 are opposite side views of the first counting-wheel. Fig. 12 is an outside view of the frame for supporting the operative mechanism, said view not only showing the device for moving the pendulous or swinging frame, but also the crank for turning the "setter," to be described. Fig. 13 is a longitudinal section of said crank. Fig. 14 is an elevation of the spring and the studded disk for determining the position of the setter, as hereinafter explained. Fig. 15 is a view of the register or counting-machine with that side of the case to which the gate is applied removed.

The register or counting-machine is designed to indicate the number of movements made or articles produced from time to time by a machine—as, for instance, the number of impressions made by a printing-press, or the number of strokes of the piston of a pump or steam-engine. It is applicable to very many machines used in the arts. Its operative parts are mostly inclosed in a case, A, having in its front a series of apertures, a,

covered by a pane of glass, through which the figures on the counting-wheels can be readily seen. These counting-wheels (shown at B, C C C, and D) are arranged on a stationary shaft, E, having a straight groove, *b*, in it lengthwise of it, each wheel being arranged to revolve freely on the shaft. Between each wheel and the one next to it, and encompassing the shaft, there is a thin washer, *c*, having its eye provided with a tooth, *d*, to enter the groove *b*, and thereby prevent the washer from revolving on the shaft. The washers are to keep the wheels apart in order that any one of them shall not bear or rub against a next one, so as to accidentally revolve it. Each wheel of the series has on its periphery the figures 0 1 2 3 4 5 6 7 8 9, such figures being at equal distances apart at their centers. The first counting-wheel, B, has projecting from its outside a gear, F, having nine teeth, *c*², and between the first one and the last one of them a space, *d'*, equal in size to a tooth and the two spaces between it and the two teeth between which it is situated—in other words, this nine-toothed gear is like a ten-toothed gear with one tooth removed. Each of the other counting-wheels has projecting from its side next to the first wheel a ten-toothed gear, G, one tooth of which—namely, that marked 3 and next to the figure 3 of the wheel—has a thickness less than or half that of each of the others, said tooth as well as each of the others projecting from the side of the counting-wheel. Furthermore, each of the counting-wheels, except the last one, D, of the series, has projecting from its other side a single-toothed gear, H. There is fixed to the first counting-wheel, B, at one side thereof, as shown, a ratchet-wheel, I, to be intermittently revolved by an impelling-pawl, *f*, pivoted to a lever, *g*, and pressed against the ratchet-wheel by a spring, *h*. To prevent backward turning of the ratchet-wheel, it has adapted to it a retaining pawl or spring, *i*, which is fixed to the frame K that supports the shaft E. A spring, *k*, being wound around the washer, which encompasses the pivot of the lever *g*, and having one of its ends in contact with one of the rods in the frame K, and the other of its ends in contact with a stud which projects from the lever *g*, serves to force backward the said lever after such advance of it with the pawl *f*. Behind

the series of counting-wheels is a swinging frame, L, which is pivoted to the frame K or upon a rod, d^2 , therein in a manner to enable said frame L to be swung within said frame K, so as to carry to the intermediate gears of the counting-wheels, the setter M, or the series of gears N, arranged within said swinging frame. The gears N are so arranged opposite the spaces between the counting-wheels, and are supported in such a way by the shaft l , which extends across the swinging frame, as to freely revolve upon it. The gears N are kept at their proper distances asunder upon the shaft by means of the washers m , arranged thereon, as shown. Each gear N has ten teeth, and each washer has a tooth extending from it into the groove o in the shaft, said tooth and groove being to prevent the washer from revolving on the shaft and turning either gear beside the said washer.

The setter (shown at M) is a barrel or cylinder having two ranges of teeth, a^5 and a^6 , projecting from its periphery and in opposite directions, as shown. The number of teeth in each range is the same as the number of counting-wheels. The teeth of the setter are to engage with the teeth of the gears G of the counting-wheels, except their thinner ones, (marked 3,) the paths of whose movements are not in the same plane with those of the teeth of the setter. By revolving the setter by means of the crank O, affixed to one of its ends, the several counting-wheels are revolved, so as to bring their zeros to range in line with one another and into such a position as to be seen through the glass pane of the case. The setter, therefore, is to set all the counting-wheels in their proper relations to one another for the machine to begin to count.

The handle of the crank is or may be applied to the body as the blade of a penknife usually is to its handle—namely, so as to be capable of being turned either into parallelism with or into a right angle to the said body—the object of having said handle in parallelism with the body being to move the handle out of the path of movement of the gate or plate P. The gate is fixed to the outer end of the shaft p , pivoted in the frame K, said shaft having attached to it at its inner end the cam q , extending within the recess r in the arm s projecting from the swinging frame L. The gate, when shut, covers a recess, f' , made in the adjacent side of the case A, said recess being for the purpose of containing and shielding the crank O. Access cannot be had to the said crank without opening the gate, and thereby bringing the setter into a position to revolve the counting-wheels when the crank is turned.

By shutting the gate (see Fig. 12) the cam q , by its action against the arm s , moves the frame L in a manner to move the setter away from the counting-wheels, and at the same time to carry the series of gears N up into the spaces between the said counting-wheels. Opening the gate causes the setter to be moved

in a direction toward the counting-wheels and the gears N in a direction away from them.

When the gate is open, the teeth of the setter are in position to mesh with the teeth of the gears F and G of the counting-wheels, and if the setter while in said position be revolved by turning the crank, the counting-wheels will be moved until each one presents its zero to view behind the pane of glass in the front of the case. When each wheel has been so set by the setter, said wheel cannot be further moved by it, as the teeth of the setter, while it shall continue to revolve, will pass through the space that is between the first and ninth teeth of the wheel without contact with either of said teeth.

If we suppose the lever g to be connected by the rod u with such mechanism as will impart to said rod a reciprocating movement lengthwise of it, the lever, when said rod is so moved, will be reciprocated, and will cause the impelling-pawl to intermittingly revolve the ratchet-wheel, whereby the counting-wheel B will be intermittingly revolved. When the figure 9 of said wheel arrives in such a position that it can be seen behind the pane of glass, the single-toothed gear of the wheel will mesh with the first one of the gears N, which then meshes with the gear G of the next counting-wheel C. On the succeeding movement of the lever g taking place, the first counting-wheel will be revolved, so as to cause its zero to appear to view behind the pane of glass. The next counting-wheel C will also at the same time be revolved so as to present its figure 1 to view behind the pane of glass. After each counting-wheel has been turned, so as to present its figure 9 to view behind the pane of glass, said wheel in its next movement will cause its one-toothed gear to mesh with and to turn the intermediate gear N in range with it, so as to turn the next counting-wheel one-tenth of a revolution.

From the above it will be seen that the first counting-wheel will continue to be intermittingly revolved while the machine is in operation, and in each entire revolution of said wheel the next counting-wheel will be turned one-tenth of a revolution. In each revolution of this second wheel and each succeeding wheel the counting-wheel next in advance will be turned one-tenth of a revolution, whereby the number of movements of the first wheel will be indicated by the figures which shall appear behind the pane of glass.

Each of the intermediate gears N, as well as the ten-toothed gear to engage with it, has applied to its teeth what I term an "adjuster," R, which is for the purpose of bringing the gear and that of the counting-wheel with which said gear is to engage into proper position and keeping them there, so that they will be sure to properly mesh. Each adjuster is an arm, v , having at its free end an angular head or cam, w , and pivoted on the shaft x or x' , each of the adjusters being provided with a spring, y , for forcing it against the gear,

so as to cause the angular head or cam of the adjuster to enter the space between two of the teeth of the gear, and by bearing against them force the gear into a correct position. There
5 is in the frame L a stop-rod, *z*, which prevents the upper series of adjusters from coming in contact with the series of gears G when said gears are in engagement with the series of gears N.

10 The setter has fixed to that one of its ends to which the crank is not attached a cranked wheel or disk, *a'*, (see Figs. 4 and 14,) provided with a stud, *b'*, projecting from one side of it near its periphery. Against this stud
15 bears a spring, *c'*, which is kept in position by being wound around the tubular washer of the rod *d'*, and by having one of its ends in contact with the nut at one end of the shaft *l*, as shown. The said spring is for the purpose of
20 keeping the setter in position to prevent its teeth at their ends from abutting against the ends of the teeth of the gears of the counting-wheels while the setter is in the act of being moved down to engage with said gears.

25 In range with the connecting-rod *u* there is a stud or projection, S, having arranged with and pivoted within it, as shown, a caster, T, whose shank is tubular, and whose wheel is grooved in and around its circum-
30 ference. A line or cord, U, attached to the rod *u*, passes through the shank of the caster and against the periphery of the wheel. The caster enables the line to be extended in various directions radially to said caster, the
35 caster turning and accommodating itself to the line under a draft thereon. The line is to be attached to the movable part of a machine the number of whose movements it may be desired to ascertain from time to time by
40 the register or counting-machine.

I claim—

1. The combination of the series of counting-wheels, figured and provided with the gears F, G, and H, substantially as described,
45 ed, with the swinging frame L, its series of intermediate gears, N, and setter M, and with the mechanism for intermittingly revolving, as explained, the first one of the series of counting-wheels, said mechanism consisting of the ratchet-wheel I, impelling-pawl
50 *f*, lever *g*, its rod *u*, and cord U, and springs *h* and *k*, all being arranged within a frame, K, and said frame disposed within the case A, essentially as set forth.

2. The combination of the swinging frame 55 L, provided with the gears N and setter M, to operate, as described, with the gears of the counting-wheels, with the mechanism for moving said frame L, to carry either the setter or the gears N into or out of engagement with
60 the gears F and G of the said counting-wheels, said mechanism for so moving the frame L consisting of the recessed arm *s*, extending from said frame, the cam *q*, arranged in the recess of the said arm, the shaft *p*, and the
65 gate P, all being substantially as set forth.

3. The combination, with the series of counting-wheels, the gears F, G, and H, the setter M, and the swinging frame L, substantially as described, of the studded disk *a'* 70 and the spring *c'*, secured to the said swinging frame and bearing against the stud *b'* of the said disk, all being essentially as set forth, such spring and studded disk being to
75 keep the setter in a position to prevent its teeth at their ends from butting against the teeth of the gears of the counting-wheels while the setter is in the act of being moved down to engage with said gears.

4. The combination of the frame L, provided with the recessed arm *s*, and the setter 80 M, provided with the crank O, having its handle to fold down, as described, with the cam *q* within said arm, and with the shaft *p*, and the gate or plate P, for moving the said
85 cam, such handle being to fold upon the body of the crank in order to move it (the said handle) out of the path of movement of the gate or plate P, as explained.

5. The combination of the caster having 90 the tubular shank and grooved wheel, and supported by a stud or projection, as described, with the frame A, and with the register or counting-machine, substantially as set forth, provided with the line or cord U, and
95 rod *u*, and their lever, pawl-and-ratchet wheel, as represented, and mainly consisting of the series of counting-wheels, their gears and swinging frame with its setter and series of gears, all being arranged and supported so as
100 to operate essentially in the manner and for the purpose described, the first one of the series of counting-wheels having mechanism for intermittently revolving it, as explained.

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Witnesses:

ALBERT BEARD,
MOSES CLARK.