(No Model.) 2 Sheets—Sheet 1.

S. O. GOULD.

REGISTER FOR COUNTING THE REVOLUTIONS OR STROKES OF MACHINES.

No. 458,897. Patented Sept. 1, 1891.

Fig. 1.

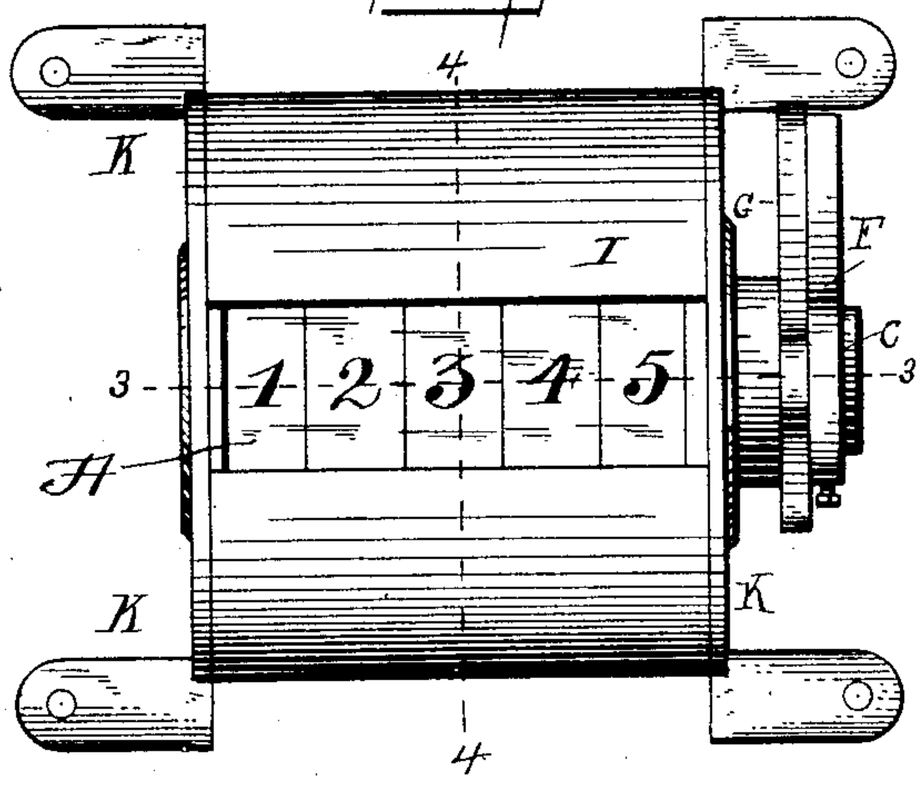


Fig. 2.

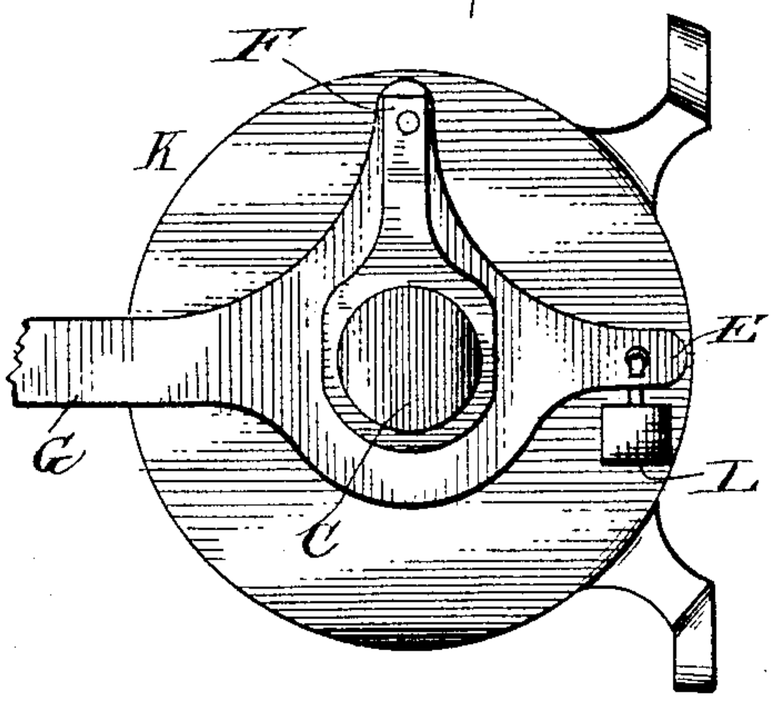


Fig. 3.

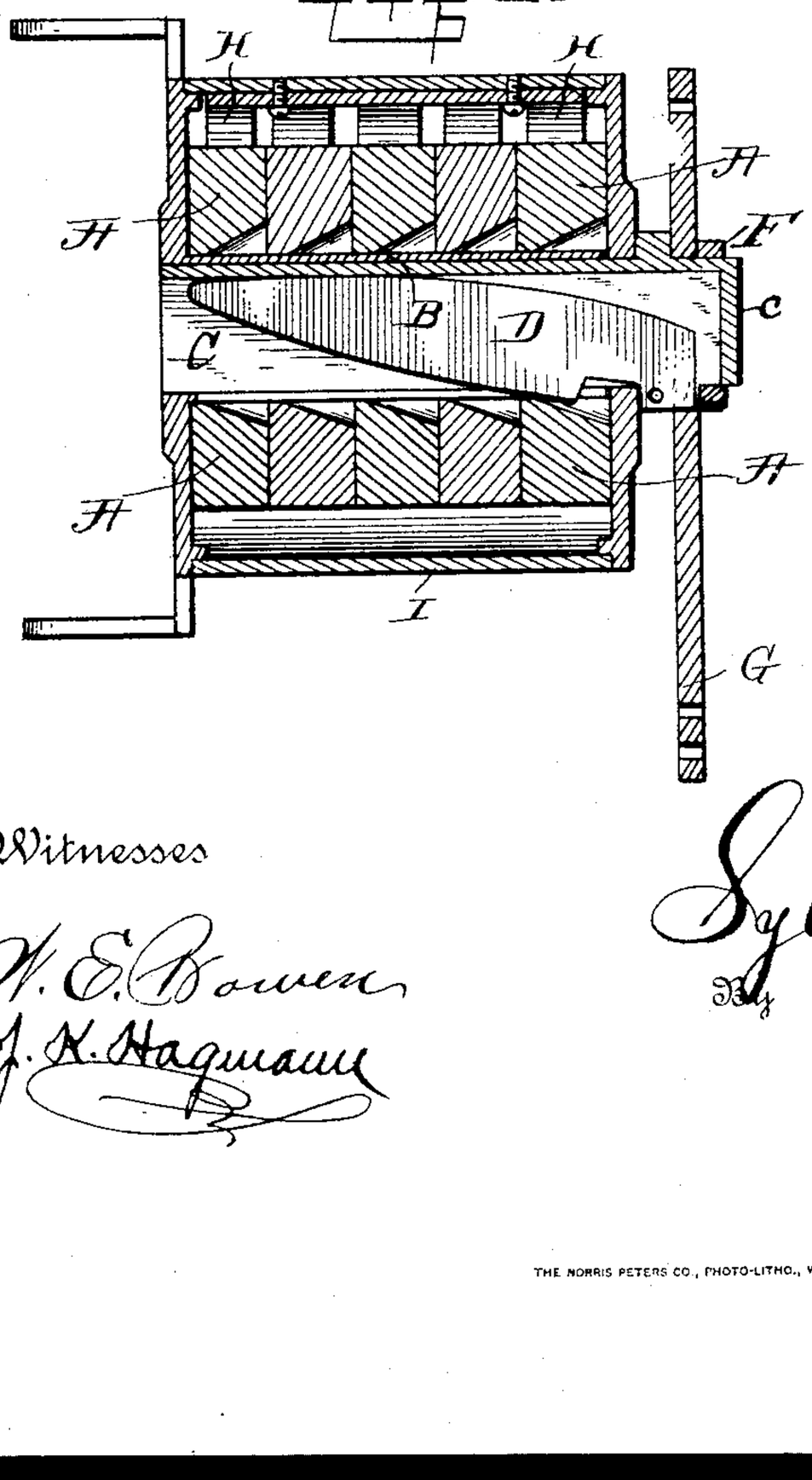
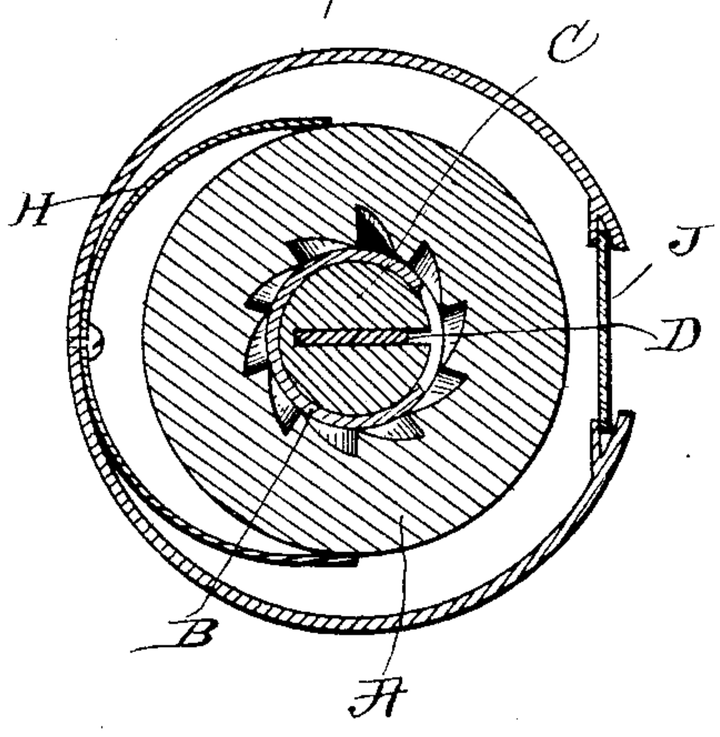


Fig. 4.



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(No Model.) 2 Sheets—Sheet 2.

S. O. GOULD.

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No. 458,897. Patented Sept. 1, 1891.

Fig. 5.

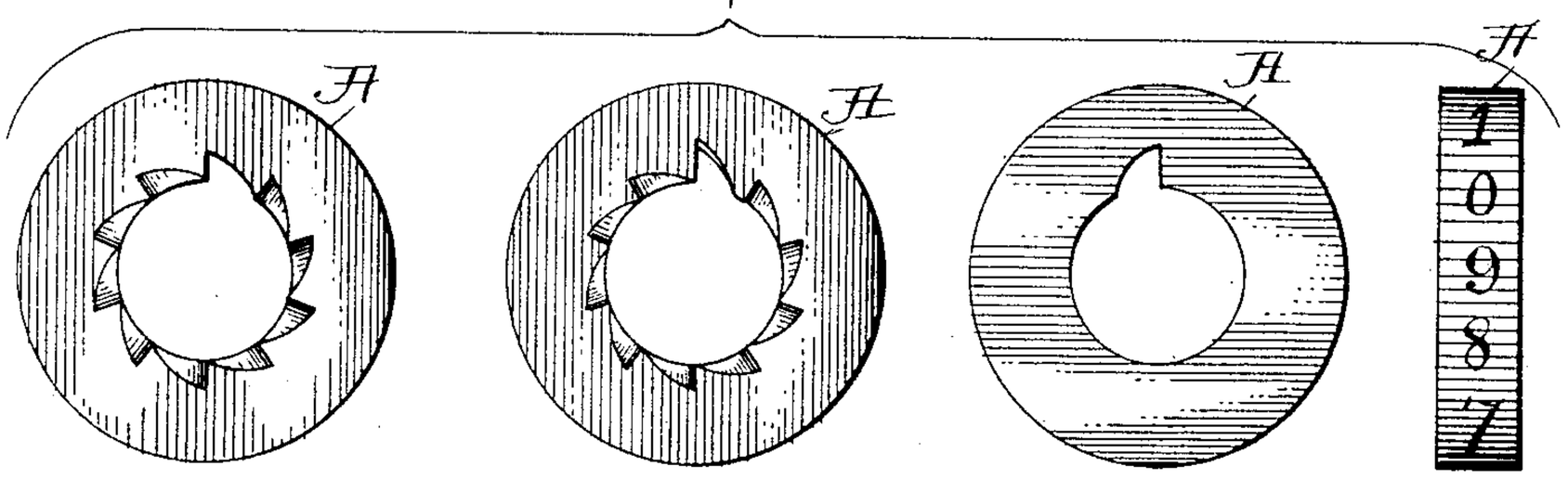


Fig. 6.

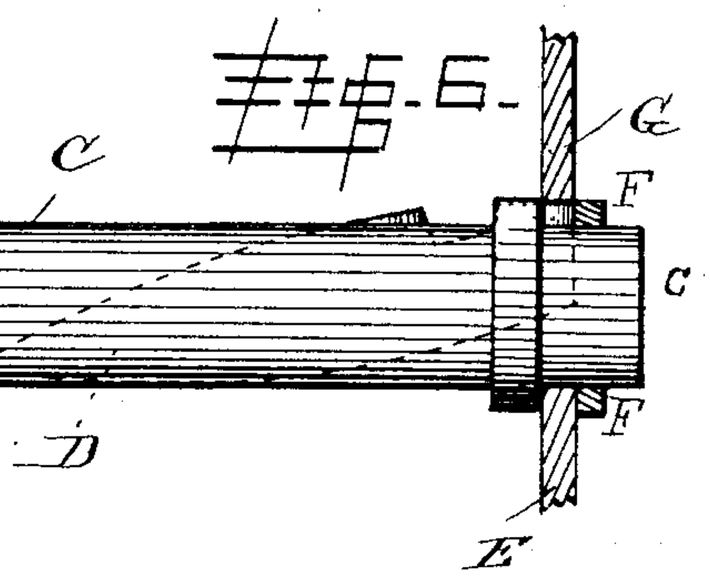


Fig. 7.

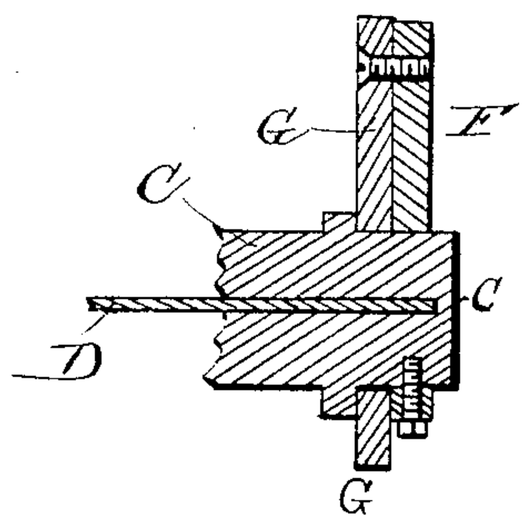


Fig. 8.

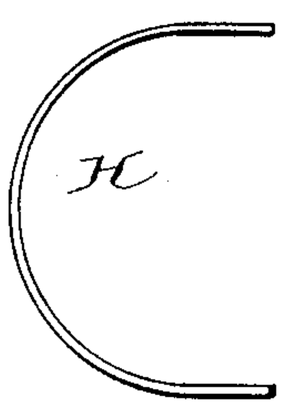
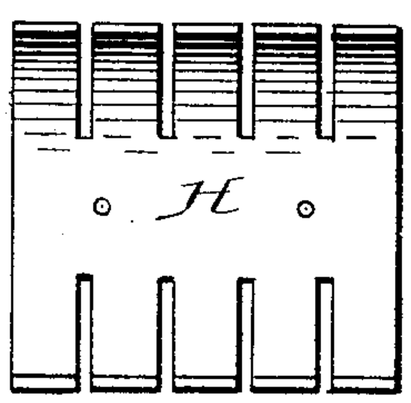


Fig. 9.



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UNITED STATES PATENT OFFICE.

SYLVESTER ONSLOW GOULD, OF LOCKPORT, NEW YORK, ASSIGNOR OF ONE-THIRD TO WASHINGTON H. RANSOM, OF SAME PLACE.

REGISTER FOR COUNTING THE REVOLUTIONS OR STROKES OF MACHINES.

SPECIFICATION forming part of Letters Patent No. 458,897, dated September 1, 1891.

Application filed September 17, 1889. Serial No. 324,271. (No model.)

To all whom it may concern:

Be it known that I, SYLVESTER ONSLOW GOULD, of the city of Lockport, county of Niagara, and State of New York, have invented a new and useful Improvement in Counting-Machines, of which the following is a specification.

My invention relates to improvements in counting-machines in which numerals on the exterior periphery of counting-wheels are brought in regular succession to a line or aperture so as to count each successive revolution or stroke of machinery with which the counting-machine is connected and show the number thereof.

The objects of my improvements are, first, to simplify the construction of counting-machines; second, to reduce the friction in and power required to operate them; third, to secure greater accuracy in their operation; fourth, to operate all the counting-wheels by a single blade or pawl; fifth, to hold all the counting-wheels from reverse motion by one spring. I attain these objects by the mechanism illustrated in the accompanying new and amended drawings, in which—

Figure 1 is a front view of my improved counting-machine. Fig. 2 is an end view thereof. Fig. 3 is a horizontal section taken on the line 3 3, and Fig. 4 is a cross-sectional view of the same, taken on the line 4 4. Fig. 5 is a detached view of the several numbered wheels or rings. Fig. 6 is an enlarged detailed view principally of the blade and its carrying-shaft. Fig. 7 is a detailed vertical section of the actuating-lever and its adjunctive parts. Figs. 8 and 9 are detached views of the spring for retaining the numbered wheel or ring.

Similar letters refer to similar parts throughout the several views.

The slot in the rock-shaft C is cut nearly through its diameter in a plane passing through its axis and longitudinally from near the left end plate K to a point far enough to the right of the collar on shaft C to enable the slot to receive the heel of the blade D, as hereinafter described and substantially as shown. In the slot the blade D is placed and pivoted to shaft C through the collar, substantially as shown, so that the heel or shorter arm of blade D is on the right side of the collar. Blade D moves loosely on its pivot, and the difference in the length of its arms causes a slight inward motion of its heel to produce a correspondingly greater outward movement of its left end or point. Blade D is so formed that when its point is moved outward to its limit in the notches hereinafter described its heel still projects somewhat beyond the circumference of the shaft, and when its point is moved back into the slot as far as it will go the shoulder of its point next to the left of the collar on the shaft C projects beyond shaft C about as far as the arc of the exterior circumference of the sleeve B, hereinafter described, and the heel of blade D is correspondingly but slightly elevated, all substantially as shown. Both the shoulder and heel of blade D always project somewhat beyond the arc of the shaft C. The space between the shoulder of blade D and the collar on shaft C is sufficient to allow the shoulder to move freely inside and clear of the right-end plate K when in position, as hereinafter described, and the point of blade D is long enough to reach and engage the extreme left-hand counting-wheel when in place, as hereinafter described. The sleeve B has about three-twentieths of its circumference cut away longitudinally, as shown, and is large enough to easily receive the rock-shaft C in its bore, and is long enough to reach into the recesses in the end plates K when in position, as hereinafter described. The counting-wheels A are substantially similar, and there may be any number of them. Each wheel has the numerals from 0 to 9, inclusive, at equal intervals around its exterior periphery, and is made hollow, as shown, its interior periphery or bore being large enough to permit it to be easily passed over and upon the outside of the sleeve B and turn easily thereon. The bore of each wheel is divided into ten notches opposite the several figures on the exterior periphery. Each notch extends from end to end of the bore, of uniform width and depth, and the front side (meaning the side which precedes as the wheel is turned when in place on the sleeve B) of each notch is in or nearly in a plane passing through the axis of the shaft C, while the rear side of each notch

forms an acute angle with the front side. Nine of the notches are of shallow depth, while the notch opposite the 0 is much deeper than the others, all being substantially as shown. The ring-lever G is formed substantially as shown, one of its short arms being in line with and the other at right angles to its long arm. Its ring is made large enough to surround the shaft C and pass over and cover the heel of the blade D when the heel is projected to its limit beyond the circumference of shaft C. The position of the lever G is on the shaft C, to the right of and between the collar on shaft C and the arm F, as shown, and the projecting heel of blade D is always covered and engaged by the ring of G. The arm F is formed substantially as shown, and is of the same length as each of the short arms of G, and is made fast to the right end of the shaft C perpendicular to the plane of the slot in C and the movement of the blade D. Arm F is pivoted to one of the short arms of G, substantially as shown, so that G moves easily on the pivot. F may be pivoted to either of the short arms of G, accordingly as it is desired to operate the machine by a connecting-rod or other device moving horizontally or perpendicularly, or according to the position in which the machine is placed. Arm F and lever G form a compound lever operating the shaft C, while as to the blade D, F is a fulcrum for lever G. The arm E is formed substantially as shown, and its position is on the left end of the rock-shaft C at right angles to the arm F and toward the rear of the machine, as shown. Arm F carries a small weight L, and its office is simply that of a brake to keep shaft C still while the ring of the lever G is engaging with the heel of the blade D, as hereinafter described. A spring friction clutch or ring would fulfill the same purpose and be preferable in some cases. The compound spring H is formed in one piece, substantially as shown. It spans the exterior periphery of all of the counting-wheels, clasping each wheel with friction only sufficient to hold the wheel still while the lever G is making its upward or reverse movement and is forcing the blade D against the rear side of the notch in the wheel, as hereinafter described. Spring H is fastened to the back of the outer case I, all substantially as shown. A separate spring for each counting-wheel could be used; but the labor and expense of construction and attachment would be much greater.

From the foregoing it will be observed that it makes no difference what numerals are at the reading-glass J; but in order to start at the beginning place all the wheels A upon the sleeve B, so that the 0 (or zero) on each wheel is at the glass, as shown in Fig. 4, the deep notch being the 0-notch. The machine then registers nothing, and is operated as follows: Raise the long arm of the lever G as far as it will go, which will be until the blade D strikes the upper or rear side of the opening in the sleeve B. This brings us to the proper beginning of the lever's movement. It will be remembered that each notch is about one-tenth of a circle or thirty-six degrees in width, while the opening in the sleeve is about three-twentieths of a circle or fifty-four degrees in width, so that this opening spans about one and one-half notches. Hence blade D is now in line with the front half of the 1 (one) notch of all the wheels. Now move the long arm of lever G downward. It swings upon the pivot whereby it is attached to the arm F, and as its ring covers and rests against the heel of the blade D the first result of the motion of G is to push the heel of blade D into the slot of the rock-shaft C and raise the long arm of blade D through the opening in the sleeve B to the bottom of the 1 (one) notch of the first wheel on the right, which notch is so shallow that it prevents blade D from engaging any wheel to the left of the first (or right) wheel, and the downward motion of the long arm of G being continued its secondary result is to turn the rock-shaft C, carrying with it the blade D and the wheel, which blade D is engaging until blade D strikes the front (or lower) side of the opening in the sleeve B and has turned the wheel one-tenth of a revolution and brought its numeral 1 in front of the reading-glass. Now reverse the motion of lever G and move its long arm back to its upper limit. The wheel A, which has just been moved, is, together with the other wheels, held from reverse motion by the spring H clasping its periphery. The pressure of the ring of lever G is taken off from the heel of the blade D, and the rock-shaft C is turned back, carrying blade D with it. This brings the long arm of blade D against the rear or sloping side of the notch it just engaged, and as blade D is loosely pivoted to shaft C and moves easily its long arm is moved back into the slot in shaft C far enough to clear the rear side of that notch. The reverse motion of lever G is only continued until the blade D strikes the upper (or rear) side of the opening in the sleeve B. This completes one movement of the lever G, during the first part of which the weight upon the arm E was useful in preventing any movement of the rock-shaft C until the blade D had engaged the 1 (one) notch in the right wheel A. It will be observed that there is no spring connected with the blade D, it being operated solely by the ring of lever G pressing upon its heel, and thus moving its long arm into a notch, and then the turning back of the rock-shaft C, bringing the edge of the long arm of blade D against the inclined plane formed by the rear side of the notch, pushes the long arm of blade D back into the slot in the rock-shaft, and that these forces operate alternately upon the arms of blade D. Such operation of the lever G being continued brings the nine digits on the right wheel successively in front of the reading-glass J, and then the next downward movement of lever G causes the blade

D to engage with the deep notch of the right-hand wheel, which permits blade D to move forward far enough to engage the 1 (one) notch in the next wheel to the left, and the turning of the shaft C, as before, carries both wheels with it the one-tenth part of a revolution and brings in front of the glass J on said second wheel the numeral 1 (one) and on the first wheel 0, forming the number 10, and the operation being continued until the first two wheels on the right register 99 the next downward movement of lever G causes the blade D to engage with the deep notches of both those wheels, which permit blade D to move forward far enough to engage the 1 (one) notch in the next wheel to the left, and the motion being continued as before the shaft C as it turns carries with it those three wheels the one-tenth part of a revolution, and the number 100 is produced before the reading-glass J, and the operation may be thus continued for any number of wheels. The 0 (or zero) notch in each wheel is the only notch deep enough to let the blade D engage a wheel to the left. When two 0-notches on the right are in line before it, D can engage the third wheel to the left, and when three 0-notches on the right are so in line D can engage the fourth wheel to the left, and so as to all the wheels from right to left.

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

1. The combination of the rock-shaft, the blade carried by said rock-shaft, the counting wheels or rings, and the actuating-lever mounted on said rock-shaft and having the arms F G, jointly adapted to actuate said shaft, substantially as set forth.

2. The combination of the rock-shaft, the blade pivoted within the rock-shaft, the ring fitted on said rock-shaft and to which said blade is pivoted, the ring-ended lever adapted to engage said blade, the counting wheels or rings, and the slotted sleeve, substantially as set forth.

3. The combination of the rock-shaft, the blade pivoted within said shaft, the fulcrum-ring fitted upon said shaft and to which said blade is pivoted, the ring-ended lever fitting said rock-shaft, the second ring also fitting the latter and pivoted to said lever, the counting wheels or rings, and the slotted sleeve encompassing said shaft, substantially as set forth.

4. The combination of the rock-shaft, the blade pivoted within said shaft, the fulcrum-ring fitted upon said shaft and to which said blade is pivoted, the ring-ended lever mounted on said shaft and pivoted to a ring also arranged upon said shaft, the serially-notched counting rings or wheels, the slotted sleeve fitted upon said shaft, and the spring adapted to engage the counting-wheels, substantially as specified.

SYLVESTER ONSLOW GOULD.

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