3 Sheets—Sheet 1.

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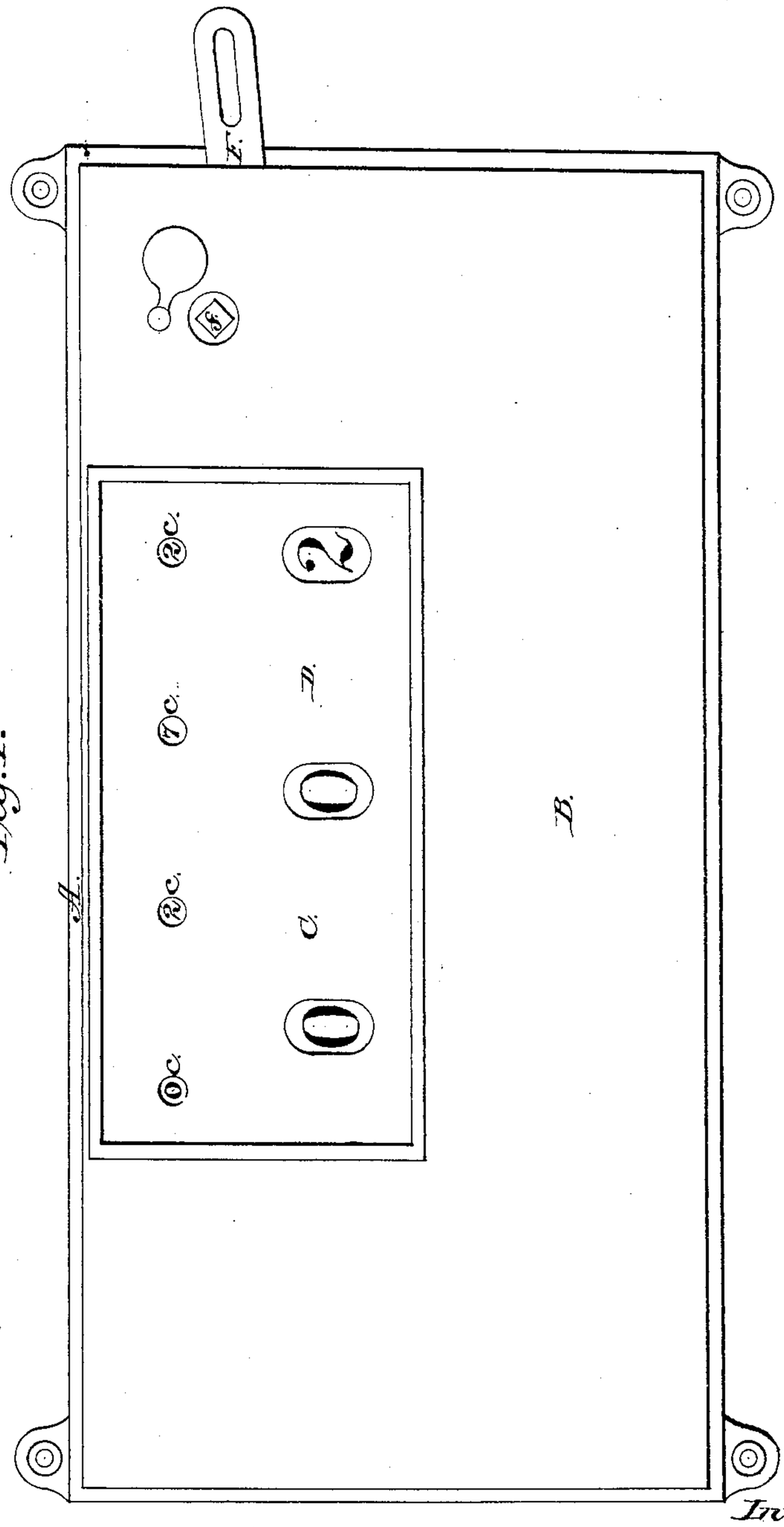
No. 200,642. **Patented Feb. 26, 1878.**

Fig. 1.



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Register.

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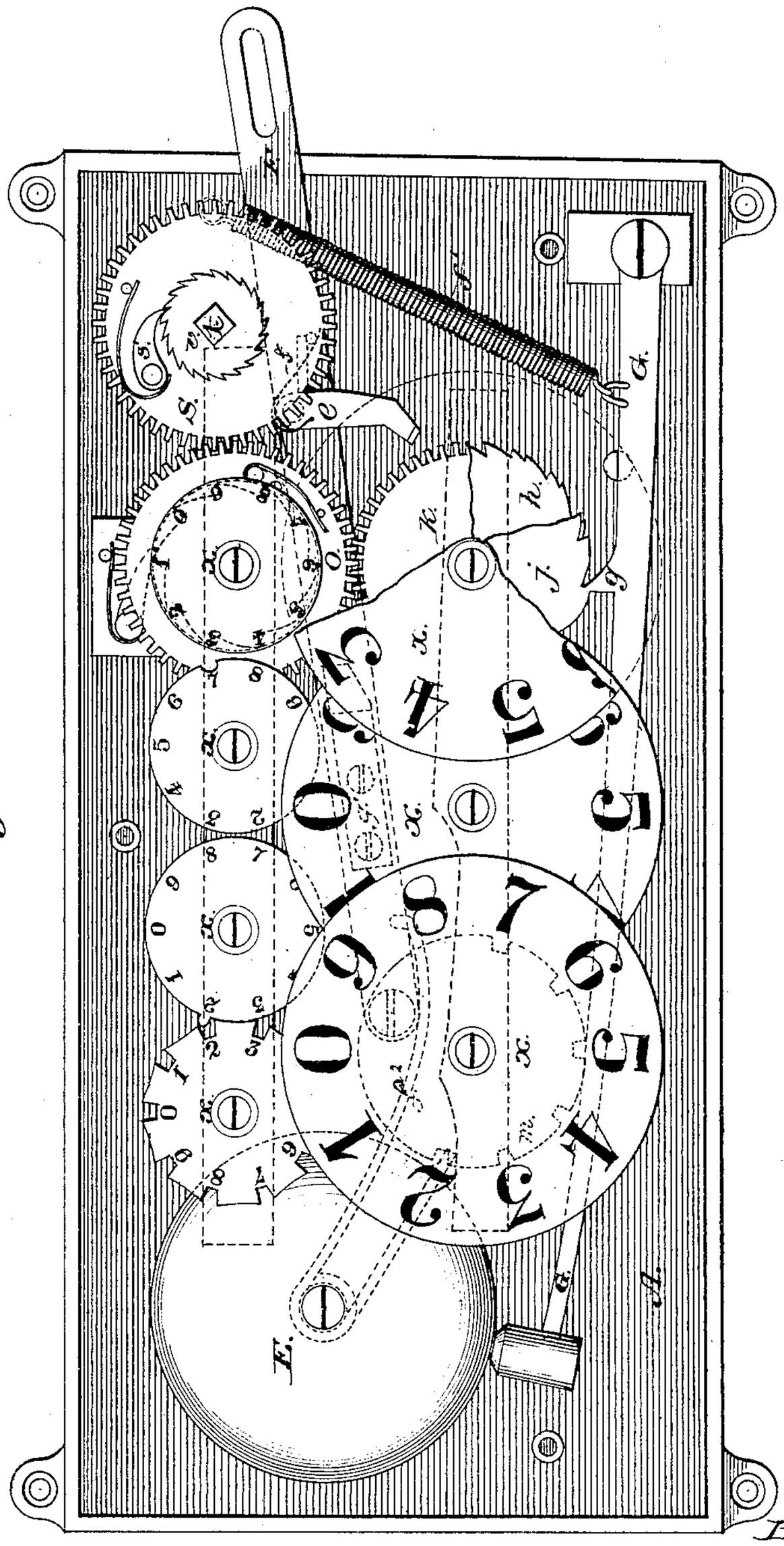

Fig. 2.

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Fig. 3.

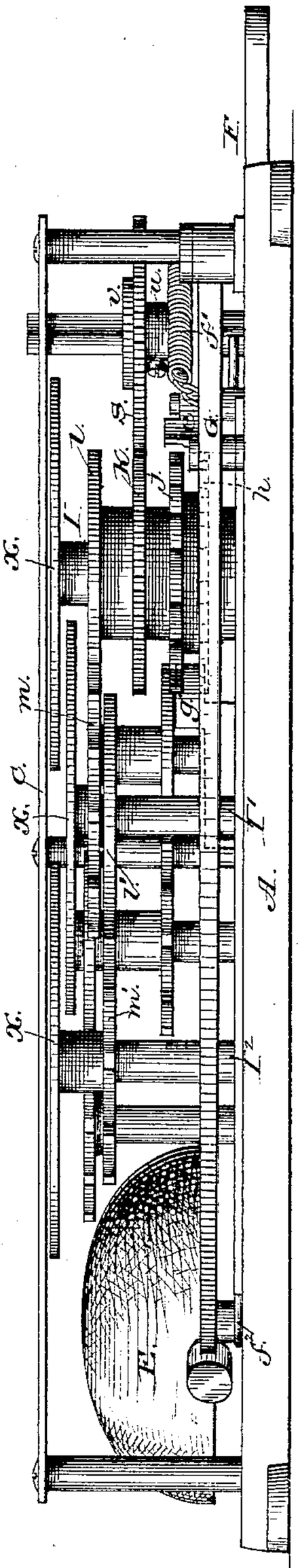
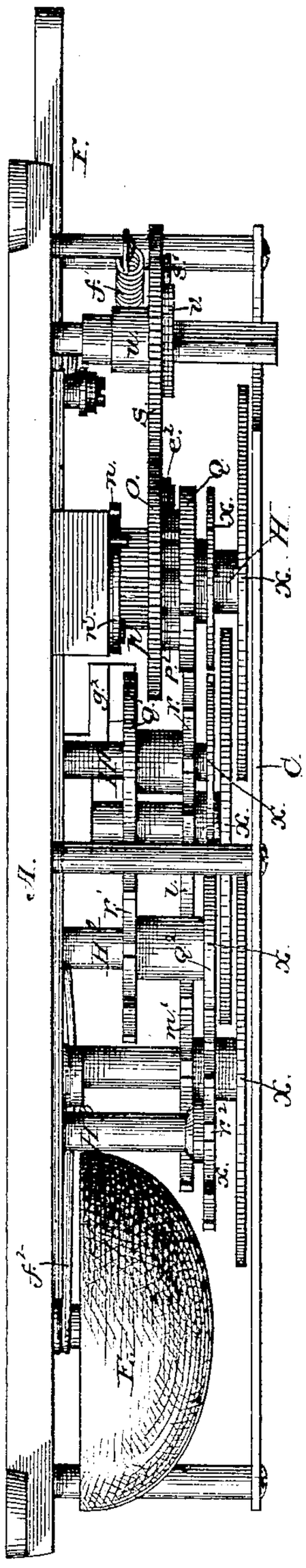


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOSEPH BENNOR AND PHILANDER POND, OF PHILADELPHIA, PENNSYLVANIA; SAID BENNOR ASSIGNOR TO SAID POND.

IMPROVEMENT IN REGISTERS.

Specification forming part of Letters Patent No. **200,642,** dated February 26, 1878; application filed August 16, 1877.

To all whom it may concern:

Be it known that we, JOSEPH BENNOR and PHILANDER POND, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Adding and Recording Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of the machine. Fig. 2 is a like view with the case and dial removed. Fig. 3 is an edge view of the recording-register. Fig. 4 is a like view of the receiving-register.

Like letters of reference in all the figures indicate the same parts.

The object of this invention is the construction of a machine that, after it has recorded, can be set back to any part of its record, and that, in setting back the register, its record or any part of it will be transferred to a second or receiving register, thus avoiding the possibility of any part of the record being lost through inadvertence.

The register is constructed with two sets or trains of wheels, only one of which is actuated by the lever. Each wheel of the two sets is firmly secured to its hub or sleeve, and on the top of each hub is secured a disk, which has on its face numerals 0 to 9, inclusive. They are viewed through openings in the dial, and as a disk is revolved each figure is seen in turn until the disk has made one revolution, when the adjoining set of wheels are moved one-tenth of a revolution, which is repeated at each revolution of the first set, and so on till the second set has made one revolution, which, in its turn, carries a third set, to move in the same manner, and so on through the entire train. The register thus actuated may have as many sets of wheels as the use for which it is wanted may require; and to prevent the possibility of adding or recording till its capacity is exhausted, (which would result in the register commnecing at zero again, and, perhaps, the loss of what it had already recorded,) we have constructed the wheel that carries the disk that records the highest number with teeth cut only in part of its circumference, so that it cannot make a full revolution. Connected with this register, in the same or a separate case, if desired, is a second or receiving register, intended to give the footing or addition of the several records transferred from the first register to this register from time to time. The two registers are similar in appearance, differing only in the parts necessary to operate each.

Referring to the drawings, A represents the base of the machine, and B the case. C is the dial, which has openings *c c c c*, for viewing the figures consecutively on the disks of the recording-register. E is a bell secured to the base of the machine. I, I^1, and I^2 are stud-shafts, which have one end permanently connected with the base A, and are provided at their other end with disks *x*, which have numerals 0 to 9, inclusive. F is the lever through which motion is conveyed to the register and alarm movements. This lever moves on a pin or screw, which is secured at one end to the base of the machine. The other end projects outside of the case. A pawl, *e*, works on a pin which projects from the lever, there being a spring, *f*, attached to the lever, which holds it to its work. The tooth of the pawl is broad enough to engage the teeth of the wheels *h* and *j* on the shaft I of the units-disk. The wheel *h* has a shallow tooth cut in base of each of its teeth. G is the bell-hammer lever, which works over a pin secured to the base of the machine at one end, the other end carrying a hammer, which, through suitable mechanism, is made to strike the bell E. On the bell-hammer lever G is a projection, *g*, which is kept in contact with the teeth of the ratchet-wheel *h* by means of a spring, f^1, said spring being under tension at one end to the lever G, and at the other end to a pin in the base of the machine.

On the lever F is a projection, *g'*, which is intended as a friction-piece, to prevent the wheels *h* and *j* from turning on their centers more than the distance of one tooth, or one-tenth of a revolution, at each actuation of the lever F. Secured to said lever is a spring, f^2, under tension, which is secured at its other end to a pin, which projects from the base of the machine. The use of this spring is to throw the lever F back at the termination of each forward stroke far enough to remove the pawl *e* from the ratchet wheel or wheels on the

units-shaft of the recording-register, to admit of the train of wheels of said register being moved in an opposite direction when required, for transferring to the receiving-register, in the manner hereinafter described.

When the lever F is pulled in the direction intended, the pawl *e* is brought into contact with the teeth of the wheels *h* and *j*, causing them to revolve, and at the moment they have traveled one tooth of their circumference, or the space of one tooth, the friction-piece *g'* is brought into contact with the surface of the teeth, and, being broad enough to act on both, prevents them from moving farther than the required distance. The lever F is limited in its movements by stops at either side of it, and when, by the action of the spring f^2, it is drawn back against one of the stops, the pawl *e* is carried beyond the point of contact with the teeth of the wheels *h* and *j*, leaving them free to turn on their axis, as hereinafter described.

The pawl *e* has a stop-pin secured to the lever F, which prevents it from being thrown out of position by the action of its spring *f*, and also holds it in position to engage the teeth of the wheels *h* and *j* on the forward movement of the lever. The wheel *h* revolves on the shaft I of the units-disk, and is separated by a collar on said shaft from the wheel *j*. Secured to and above this wheel *j* is a plain toothed gear-wheel, *k*, which meshes into a similar wheel, *s*, on the stud-shaft *t*, and said wheel *s* meshes into the wheel *o* on the units-shaft of the receiving-register.

Above the wheel *k*, and on the same hub, is secured a one-toothed wheel, *l*, which meshes into a wheel known as a "Geneva stop-wheel," (marked *m*,) which carries the tens-disk. Secured also to these wheels is a disk, *x*, which has on its face the numerals 0 to 9, inclusive, placed, in ten equal distances, at the outer edge of the disk. The one-toothed wheel *l* on the first or units shaft turns the wheel *m* on the second or tens shaft.

Secured to the wheel *m* is a one-toothed wheel, *l'*, which, in its turn, meshes into a wheel, *m'*, on the third or hundreds shaft. This last wheel *m'* has teeth cut in only part of its circumference, for the purpose already described.

The description thus far has been confined to that part of the register more minutely shown in Fig. 3.

Fig. 4, at the other side of the machine, shown in elevation, is the receiving-register, in which *n'* is a ratchet-wheel with ten teeth. A pawl, *n*, working over a pin in the base of the machine, engages the teeth of this wheel, to prevent it from turning only in one direction. The wheel is secured to the hub or sleeve that carries the units-disk, and revolves on a pin which projects from the base of the machine, turning loosely on the sleeve; and above the wheel *n* and between it and the ratchet-wheel *p*, which forms a collar for it, is a toothed or geared wheel, *o*, which engages in the wheel *k* in the recording-register.

Above the wheel *o*, and secured to the same hub it turns on, is a ratchet-wheel, *p'*. A pawl, e^2, swinging on a pin in the wheel *o*, engages the ratchet-wheel *p*, so that if the wheel *o* is rotated in one direction its motion is communicated by means of a pawl, e^2, to the ratchet-wheel *p'*; and if turned in the opposite direction, the pawl *n'* engages the wheel *n*, and prevents the hub, with all its wheels, from moving in that direction. Above the ratchet-wheel *p'*, and secured to the same sleeve, is a one-toothed wheel, *q*, which, in its turn, engages a Geneva stop-wheel, *r*, on the tens-disk hub. On this hub, and secured to the wheel r^1, is another wheel, Q^1, which, in its turn, engages a wheel, *r*, on the hundreds-disk hub. This wheel also has a wheel, Q^2, secured to it, which engages a wheel, r^2, on the fourth stud, or thousands-disk. All the wheels on each stud are secured to a sleeve, and on the top of each is fastened a disk, *x*, having the numerals 0 to 9, inclusive, arranged in the order of numerals, and in the direction in which the wheels turn. A screw or pin in the top of each post keeps the wheel connected therewith in its place. A dial, C, surmounts the whole, and has openings *c c c c*, large enough to admit of one figure only appearing at each opening. The gear-wheel *s* meshes in the wheel *o*, and is loose on the shaft *t*, turning between a collar, *u*, and the ratchet-wheel *v*, both of which are firmly secured to the shaft. On the wheel *s* is a pawl, *s'*, which moves on a pin secured to said wheel, and engages the ratchet *v*. The end of the shaft *t* is squared to receive a key.

The operation of the machine is as follows: Pull the lever F from its place of rest in the direction it will move until it comes to a stop. The result will be that the pawl *e* will, in its traverse, engage a tooth in each of the ratchet-wheels *h* and *j*, which will turn on their centers, and as they turn, the projection *g* on the lever G, being in contact with the wheel *h*, will be raised, and, at the completion of the stroke of the lever F, carried over the highest point of the tooth, and fall into the recess formed by the next tooth, thereby causing the hammer on the end of the lever G to strike the bell E and sound the alarm. The wheel *h* has a notch formed in the back of each of its teeth, which serves as a catch to hold the bell-hammer lever, and prevent the hammer from striking the bell in case the lever F is permitted to return to its place of rest after having been moved only a part of its stroke. The notch is intended to be formed near the root of the tooth, so that if the lever F is not moved a sufficient distance to raise the projection *g* on the bell-hammer lever G over the notch, then the recoil will not have sufficient force to vibrate the lever enough to strike the bell.

Instead of the wheel *h* having notches or fine teeth cut in the back of its teeth, there may be substituted a ratchet-wheel with fine teeth secured to the wheel *h*, and a pawl made

to fall into the teeth as the wheel revolves, to hold it from turning back.

The lever G is drawn back to its place of rest by the force of the spring f^1, and the pawl e will ride over the teeth of the wheel h, which is prevented from moving backward by the projection g engaging in the shallow or main teeth of the wheel h, already described.

Thus it will be seen that the teeth of the wheel h become guides to the pawl to ride upon in its backward movement, and prevent it from dragging over the teeth of the wheel j, which wheel would turn backward if it were not for this shield of protection.

The operation of the lever, as described, rings the bell, and at the same time causes the wheel j to turn on its center, turning the hub to which it is secured, and carrying with it the units-disk the distance of one tooth, or one-tenth of its circumference, causing the figures to change, and increasing the register one unit. This is repeated as often as the lever is pulled until the one-toothed wheel l engages the Geneva stop-wheel m on the tens-disk hub. The moving of this wheel one tooth increases the record one, when the cipher (0) appears on the units-disk, making ten. This is continued at each actuation of the lever till the hundreds-disk has recorded as far as it can turn—there being a stop formed in the wheel by cutting teeth only in part of its circumference, thus preventing the one-toothed wheel on the tens-disk from turning, and consequently stopping the register.

The gear-wheel k moves with the units-registering wheel, as before explained, and as it meshes in the gear-wheel o on the units-hub of the receiving-register, this wheel consequently turns with it; but as the wheel o is loose on its shaft, and as the motion it receives is in a contrary direction to that required to engage the pawl e^2 with the ratchet-wheel p', it will readily be seen that it will turn without moving the receiving-register.

If a key is applied to the square on the end of the shaft of the wheel s, and turned in the direction to reverse the motion of the recording-register, the ratchet v will engage the pawl s', and the wheel s be made to turn, which will turn the wheel o on the units-hub of the receiving-register in the direction to engage the pawl s' with the ratchet-wheel p'; and as the ratchet-wheel is secured to the hub that carries the unit-registering wheel and disk, and as the wheels k o are of the same diameter and have the same number of teeth, it will follow that they make the same number of revolutions in the same time; and as the figures on the tens-disk of the receiving-register are placed in a reversed order to those in the recording-register, it follows that whatever number the recording-register is turned back the receiving-register will show in its record. In this way any part or the whole of the record of the recording-register may be transferred. The two registers may be connected by an intermediate wheel, set so as to mesh in both of the wheels k o.

The operation of the receiving-register is the same as that already described for the recording-register. The lever F may be hung in the center, and both ends project through the case of the machine, and the register operated at either end of the case.

What we claim as new, and desire to secure by Letters Patent, is—

The combination of the receiving-register with the recording and transfer register by means of the gear-wheels k, o, and s, ratchet-wheels n and v, and the pawls e^1 and s', or their equivalents, whereby the receiving-register is permitted to remain in a state of rest while the recording-register is turned in one direction for recording, but is caused to turn simultaneously with the recording-register, to receive the transfer, when the recording-register is turned in the opposite direction, substantially as set forth.

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PHILANDER POND.

Witnesses:
STEPHEN USTICK,
HENRY POLSY.