(No Model.)

S. M. BALZER.

REGISTER OR COUNTING DEVICE.

No. 489,703. Patented Jan. 10, 1893.

Fig. 1.

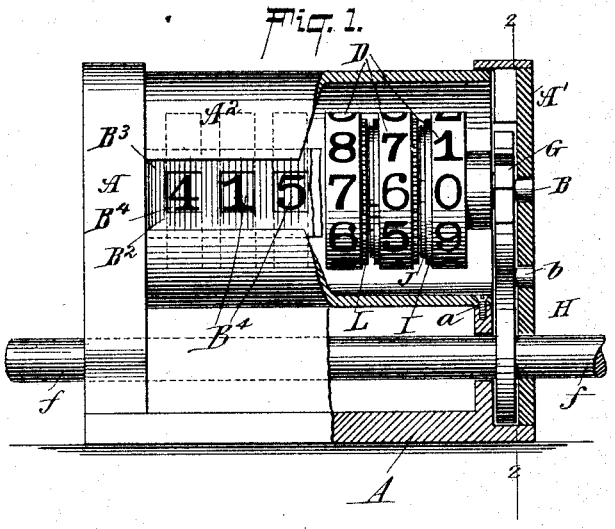


Fig. 2.

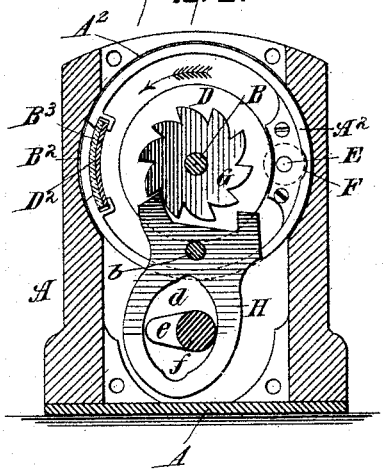


Fig. 3.

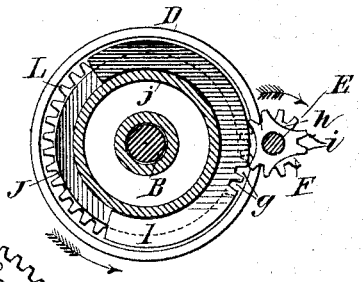


Fig. 4.

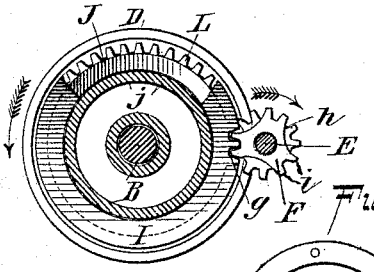


Fig. 7.

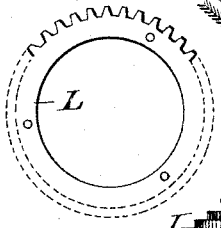


Fig. 8.

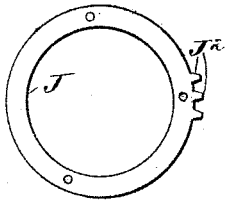


Fig. 5.

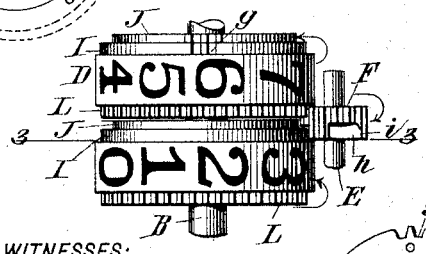


Fig. 6.

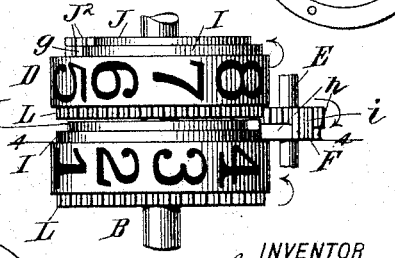
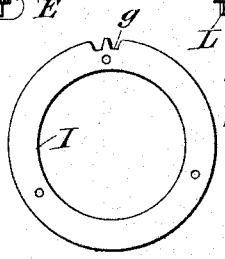


Fig. 9.



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UNITED STATES PATENT OFFICE.

STEPHEN M. BALZER, OF NEW YORK, N. Y., ASSIGNOR TO THE DAVIDS MACHINE WORKS, OF NEW YORK.

REGISTER OR COUNTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 489,703, dated January 10, 1893.

Application filed April 21, 1892. Serial No. 430,013. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN M. BALZER, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Registers, of which the following is a specification.

My invention relates to the class of registers or numbering devices in which the numbers are carried on disks or wheels.

The invention has for its object to provide means to permit ready inspection of the numbers in whichever position the device may be situated.

Another object of the invention is to simplify and improve the mechanism that causes the number-disks or wheels to turn to indicate the number of turns or reciprocations of the shaft or part to be counted.

The invention consists in the novel details of improvement and the combinations of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming part hereof, wherein,

Figure 1, is a partly broken side elevation of a register embodying my improvements; Fig. 2, is a vertical cross section on the plane of the line 2—2 in Fig. 1; Fig. 3, is a cross section on the line 3—3 Fig. 5; Fig. 4, is a similar view on the line 4—4 in Fig. 6; Figs. 5 and 6, are edge views of two number disks, showing their pinion in different positions; and Figs. 7, 8, and 9 are detail views of rings hereinafter specified.

In the accompanying drawings A, indicates a suitable casing or frame that carries a shaft B, upon which are loosely hung the desired number of disks or wheels D, upon the peripheries of which are suitable numerals or symbols. The end A′ of the casing A is removable to permit access to the parts and it can be held in place in any desired manner. As shown in Figs. 1, and 2, the part A^2, of the casing A is cylindrical and incloses the disks D, and this cylinder A^2, carries a shaft E, parallel with the shaft B, but outside of the disks D (see Figs. 2 3 and 4). Upon the shaft E, are hung loosely a number of carrying pinions F. The cylinder A^2, has an opening B^2, on one side of sufficient width to permit one figure of each disk D (and thereby a row of figures) to be seen as in Fig. 1. The opening B^2, is preferably provided with a glass D^2, to exclude dust, &c., and also with a plate B^3 having apertures B^4, arranged in line with the figures on the disks so that the figures can be seen without observing the mechanism (see Figs. 1 and 2).

The cylinder A^2 is carried in bearings in the casing A in such manner that it can be turned on its longitudinal axis B to permit the figures on the disks D to be conveniently seen in whichever position the device may be held. The cylinder A^2 may be held in position by a screw *a*, or otherwise which is first removed before the cylinder A^2 is turned as stated and then replaced to hold the cylinder in the new position. To reach screw *a*, the end A′ of casing A is first removed. When said cylinder is thus turned the shaft E will necessarily travel around and then the pinions F, will cause the disks D to turn uniformly on the shaft B, whereby the proper relative positions of the disks D to their respective pinions and to the opening B^2 will be maintained. This turning of the cylinder will be found very useful, as in many cases the register can only be held in a certain position in which the inspection of the disks D would not be convenient, even if possible, unless the cylinder A^2 were capable of being turned.

The disk D representing units (or the one on the right in Figs. 1 and 7) is to be turned by the shaft, wheel, or other part whose motions are to be counted and for this purpose I have connected to said disk a toothed wheel G, that can be actuated or turned by a pallet or pawl H, which is suitably supported to swing within the casing A, say on a pivot *b*. The pallet H, is shown having a cam-like opening *d*, within which works a projection *e*, on a shaft *f*, which preferably projects from both sides of the casing A, to permit it to be connected to the moving part to be counted on either side. As the shaft *f* turns, its projection *e* will rock the pallet or pawl H, and thus turn the wheel G, and thereby the units-disk D. But any other suitable means may be used to turn said disk if desired.

The disks D on one side (say on their left

hand side in Fig. 1) have a circular external rim or ring I in which are cut depressions *g*, (see Figs. 3 4 and 9) on one side.

Each pinion F, is cut away as at *h*, in say three places (see Figs. 3, 4, 5 and 6) two teeth *i* in three places being left uncut as shown. The cut-away parts *h*, of the pinions F, are adapted to ride on the rims I, as in Fig. 3, which prevent the pinions from turning until the teeth *i*, encounter the depressions *g*, which will permit said pinions to have partial revolution (see Fig. 4). The disks D also carry another rim or ring J, on the same side as the rim I, and preferably of less diameter, in which are cut one or more teeth J^2, corresponding to the depressions *g*, the space between teeth J^2 and depressions *g*, being arranged side by side to receive the leaves of the pinions F, conjointly and simultaneously. The disks D, on the side opposite the rim I carry gears L, that mesh with the respective pinions F, one pinion being situated between two disks D (see Figs. 5 and 6) whereby one disk D will communicate motion to the next, and so on. The gears L, and rims I, J, are preferably in the form of rings attached to the disks D, (see Figs. 5 and 6) although the parts might be otherwise arranged.

In operation the disks D are all set with the "0" in line to show through the opening B^2 in the casing A, or cylinder A^2 thereof. The shaft *f* being now turned turns the units disk D, its pinion F thereupon riding on the rim I of said disk D which locks the pinion and prevents it from turning. When the units disk D has made about one revolution the teeth J^2 on the rim or ring J will engage one set of teeth *i* of the pinion F, and thus turn it partially around (see Fig. 4) to bring the next cut-away space *h*, in line with the rim I (see Fig. 3), the pinion F in this latter movement turning the next or tens-disk D the distance from one numeral to another. After the tens-disk D has been given one revolution the hundreds-disk will be turned one space and so on throughout the series of disks. With the arrangement shown in Fig. 2, the shaft *f* will turn ten times in order to turn the units disk D once. As the pinion F, cannot turn until the depression *g*, of the rim I meets teeth *i* of the pinion a positive action is insured as there is no danger of one disk being turned out of its order.

By making the rims I, J, and gear wheels L of separate rings as in Figs. 7, 8, and 9 they can be readily adjusted to the proper positions and can be easily replaced if a tooth breaks without having to replace a whole disk.

The disks D are or may be provided with hubs *j*, upon which the rings I, J, and L, fit, (see Figs. 3 and 4.)

It will be understood that the units disk D need not carry teeth L, as it is turned by the wheel G, and the disk D that indicates the first or highest numeral on the left need not carry the rims I, J, as it does not communicate motion to a disk.

By removing the parts A', A^2, G, and H, the disks D, pinions F, &c., can be readily reached. The disks return to zero after they have all been turned sufficiently far in the forward direction and need not be re-set.

My device will be found complete, simple, and perfect in operation. It is not liable to get out of order and can be made cheaply. By placing the pinions F, at the outer sides of the disks D they are free in their movements, and can be readily reached and adjusted.

It will be understood that by suitably connecting the shaft *f*, with a reciprocating or rotating part of any desired machine its movements can be accurately counted.

Having now described my invention, what I claim is:

1. The combination of a casing having a cylindrical part A^2 adapted to be turned, and an opening B^2 in said part A^2, with a series of disks to indicate motions, said part A^2 inclosing said disks, and being adapted to be turned to permit inspection of the disks in different positions of the device, substantially as described.

2. The combination of a casing having a cylindrical part A^2 and an opening B^2 therein, said part A^2, being adapted to be turned a shaft E, carried by said part A^2, pinions F on said shaft and number disks D within said casing to be turned by and with said pinions as the part A^2, is turned around, substantially as described.

3. The combination of a casing having a cylindrical part A^2, adapted to be turned, said part A^2 having an opening B^2, a shaft E carried by the part A^2, pinions F on said shaft, said pinions having cut away parts *h*, disks D, within the part A^2, said disks having rims I, with depression *g*, and gears L, whereby as the cylindrical part A^2 is turned it will carry the pinions around and thus turn the disks relatively, substantially as described.

4. The combination of the casing A, having a cylindrical part A^2, adapted to be turned the latter having an opening B^2, a plate B^3, having openings B^4, disks D, having numbers on their peripheries, and pinions F for turning said disks, and a shaft E for said pinions and carried by the part A^2 consecutively substantially as described.

5. The combination of a shaft and disks D mounted thereon, and means for turning one of said disks, a rim I on the side of one disk, a depression in said rim, a pinion having cut away parts *h* to engage said rim, the depressions on rim I receiving a tooth on said pinion to permit the latter to turn and gears on the side of the next disk engaging said pinion, substantially as described.

6. The combination of a shaft, disks hung thereon, removable ring-like rim I, on the sides of said disks, the rim I having a depression *g*, on its periphery, gears L, on the opposite side of said disk, rim J, having teeth, the space between said teeth being arranged by

the side of the depression *g* pinions F, having cut away parts *h* to ride on said rim, and enter the depression *g*, to permit the pinion to turn said pinion engaging the gears L, and means for turning one of said disks, substantially as described.

Signed at New York, in the county of New York and State of New York, this 19th day of April, A. D. 1892.

STEPHEN M. BALZER.

Witnesses:
T. F. BOURNE,
WM. S. TISDALE.