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UNITED STATES PATENT OFFICE.

JOHN T. HAWKINS, OF BROOKLYN, NEW YORK.

COUNTING-REGISTER.

SPECIFICATION forming part of Letters Patent No. 227,975, dated May 25, 1880.

Application filed May 13, 1879.

To all whom it may concern:

Be it known that I, JOHN T. HAWKINS, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful improvement in registers or counters for recording the revolutions or definite motions made by steam-engines, printing-presses, or other machines, which improvement is fully set forth and illustrated in the following specification and accompanying drawings.

The object of the invention is to provide a very simple, cheap, durable, and trustworthy recording apparatus; to which end, therefore, the invention consists in the respective individual combination, with each wheel of a series of fac-simile digit-wheels loosely mounted upon one and the same axial shaft, of each pawl of a series of separate and independent actuating-pawls.

It also consists in a special combination, with an axial rock-shaft, of a secondary pawl-shaft operated thereby, as will be more fully hereinafter described, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 is a front view of the apparatus with the cover open and hanging downward, exhibiting the interior parts. Fig. 2 is a transverse vertical section, showing the case closed. Fig. 3 shows each side in elevation and a transverse section of one of the recording disks or wheels. Fig. 4 is a side elevation and a view in plan of one of the pawls. Fig. 5 is a section through the series of pawls, taken at the line X X in Fig. 2.

In these figures, the rectangular case C contains the mechanism, and is closed by the cover C', hinged thereto, and secured in place by the spring-catch c. The cover C' has openings O, through which but one row of numbers can be read when the case is closed. The shaft S is journaled in the ends of the case and projects sufficiently beyond one end to receive the lever L. The said lever is secured to the shaft S, and obviously, when suitably connected to the rotating or reciprocating parts of any machine, will then impart motion to the mechanism within the case C. Within the said case are two levers or arms, *l l*, secured to the shaft S', and also to a smaller shaft, S².

The disks R R, &c., five in number, (or any number of said disks or recording-wheels may be employed,) are each provided on one side with ten ordinary ratchet-teeth, and have plain or smooth cylindrical faces, upon which faces are engraved, cut, or stamped the ten digits in regular order, as is shown in Fig. 1, a single notch or depression of any suitable form occupying a part of the width of each face except the face of the last wheel, as shown at *b*. The ratchet or digit wheels R R turn loosely upon the shaft S, and are held in any one of ten positions, independent of each other, by the retaining-springs *r*.

Upon the rod or shaft S² are as many pawls, P P' P² P³ P⁴, as there are ratchet-wheels R. The said pawls are loose upon the rod or shaft S', and are held in position laterally by pins in the rod S', or by the ends of coiled springs s² s², which are wound upon the extended hub of each pawl P P' P², &c. The free ends of the springs s² rest in small curved recesses in said pawls, as shown at *y*, Fig. 4.

The units-pawl P is so placed upon the rod S' as to engage the ratchet of the units-wheel only. The pawl P' is so placed as to bear partly upon the units and partly upon the tens wheel, so that when, by the rotation of the units-wheel, the single notch or depression *b*, Fig. 3, is brought around, the pawl P' drops down into said notch or depression, and is thus permitted to move the second or tens wheel one digit by falling into its ratchet, and during the other nine positions of the units-wheel the pawl P' is prevented from actuating the tens wheel by being supported upon the plain cylindrical surface of the units-wheel. The pawls P² P³ P⁴ are similarly placed with reference to their respective ratchets and the next adjoining wheel, so that for the ten movements of any wheel the next wheel to the left in Fig. 1 can make but one movement; but with this construction, as so far described, it will be observed that with the recording-wheels all in position to bring the zeros in front of the line of openings in the cover, and by giving at the same time to the lever L a continuous vibratory motion of a proper amount, the units-wheel will successively present the digits until the number 9 appears, when at the next

motion the pawl P' will drop into the single notch b , Fig. 3, of the units-wheel, and thus push also against a tooth of the tens-wheel, thereby moving said wheel and bringing the number 1 into view, and the notation will thence correctly continue until the tens-wheel presents the number 9, when at the next motion the pawl P^2 will drop into the single notch b of the tens-wheel, thereby, in the manner above explained, rotating the hundreds-wheel one tooth and causing the indication or notation to pass from the number 90 to the number 101, and similarly, when the hundreds-wheel has come to present the number 9, the pawl P^3 would drop against the single ratchet-tooth of the hundreds-wheel, causing the indication to pass from the number 900 to the number 1002.

In order to avoid the errors of notation above set forth, and to cause the successive presentation of a number always increasing by one, a projecting piece, p , is rigidly attached to the pawl P^2 , extending over to bear upon the top of P' , and similarly from P^3 to rest upon P^2 , and from P^4 to rest upon P^3 , so that P^2 cannot drop into the single notch of the tens-wheel, and thus rotate the hundreds-wheel, until P' drops into the notch b of the units-wheel, and similarly P^3 and P^4 cannot drop into notches b of the adjoining wheels until P' drops into notch b of the units-wheel.

The projecting arms p p' p^2 may be made of wire, as shown in the drawings, riveted each into its respective pawl, or said arms may be cast upon and form part of each pawl, as may be most convenient for construction. The last wheel in a series (the ten-thousands-wheel, in this case) does not require the single notch b , as is shown in the drawings.

In most registering-instruments of this character considerable difficulty is encountered in setting all the wheels so as to present the zeros at the openings O from the fact that where rotary wheels are used to present the numbers one of said wheels is made to carry some device which engages some part of or some piece attached to the next wheel, thus causing the expenditure of considerable time and trouble to bring all the wheels to the zero-points.

In this construction it will be seen that each wheel may be rotated in one direction for any number of figures or entire rotations without disturbing the other wheels, so that it is but a moment's work to set any wheel at zero, or at any figure or number desired.

A spring, S^3 , is coiled about the hub of the lever L , one end, e , of said spring entering a hole in the case C and the other end a hole in the lever L , in order to give a return motion to said lever should it be found desirable to use the instrument under such circumstances that motion is imparted to it in one direction only.

In order to limit the backward motion of the

pawls P P' , &c., a stop, T , Fig. 2, is formed on each of the levers l , which stop comes in contact with the inside of the case C . In the back of the case C are holes V V , through which holes the instrument may be secured in place by means of screws.

I am aware that this my said invention is not new in broad general principle, and I do not separately claim as new, *per se*, any one part of the machine herein described; but the exact similitude of every disk or digit numbering wheel used I believe to be a new feature, *per se*, in such machines, as well as the combination of an axial rock-shaft with a secondary pawl-shaft operating the whole series of pawls, for I am not aware that such disks, exact counterparts or fac-similes of each other and mounted upon an axial shaft common to all, have ever before been employed, the advantages of which construction are quite obvious.

Having thus fully described my said improvement in registers or counters and its mode of operation, as of my invention I claim—

1. In a register or counter, a series of digit or numbering wheels separately and loosely mounted side by side upon one common shaft, each wheel consisting solely of a smooth peripheral face or circumference of uniform diameter having the digits or numbers inscribed thereon, with a single notch or depression only in one side of said face, and ten ratchet-teeth adjoining the side of said face opposite said notch, substantially as and for the purposes set forth.

2. A register or counter consisting of a shell or case, as described, having therein but a single series of pawls, constructed as described, and all mounted upon one and the same rocker-frame, in combination with a series of fac-simile digit or numbering wheels, all separately and loosely mounted side by side upon one and the same axial shaft, and each wheel solely consisting of a peripheral digit-face, formed as described, having ten ratchet-teeth on but one side thereof, said wheels, thus constructed, arranged, and mounted, being each directly rotated by means of one of said pawls, each of which, except the first, overhangs the digit-face and ratchet-teeth, respectively, of two adjoining wheels, whereby said wheels are each independently and positively actuated by a single and different pawl and left free for correct set or adjustment independently of any pawl movement or action, substantially as and for the purposes set forth.

3. A register or counter consisting of a shell or case, as described, provided therein with a series of fac-simile digit or numbering wheels, all separately and loosely mounted upon one and the same axial rock-shaft, and each wheel consisting solely of a peripheral digit-face, formed as described, having ten ratchet-teeth on but one side thereof, in combination with a single series of pawls only, all supported

upon one and the same secondary shaft connected to said axial rock-shaft, and each of said pawls except the first two being provided with a lug or projection resting upon its fellow pawl, as described, whereby each member of said series of pawls and wheels is operated at the proper time by the rocking mo-

tion of said axial shaft, substantially for the purposes set forth.

JOHN T. HAWKINS.

Witnesses:

SAM S. WETTER,

- GEORGE OWEN.

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