A. F. DIXON.

COUNTING APPARATUS.

APPLICATION FILED SEPT. 13, 1916.

1,356,607.

Patented Oct. 26, 1920.

Fig. 1.

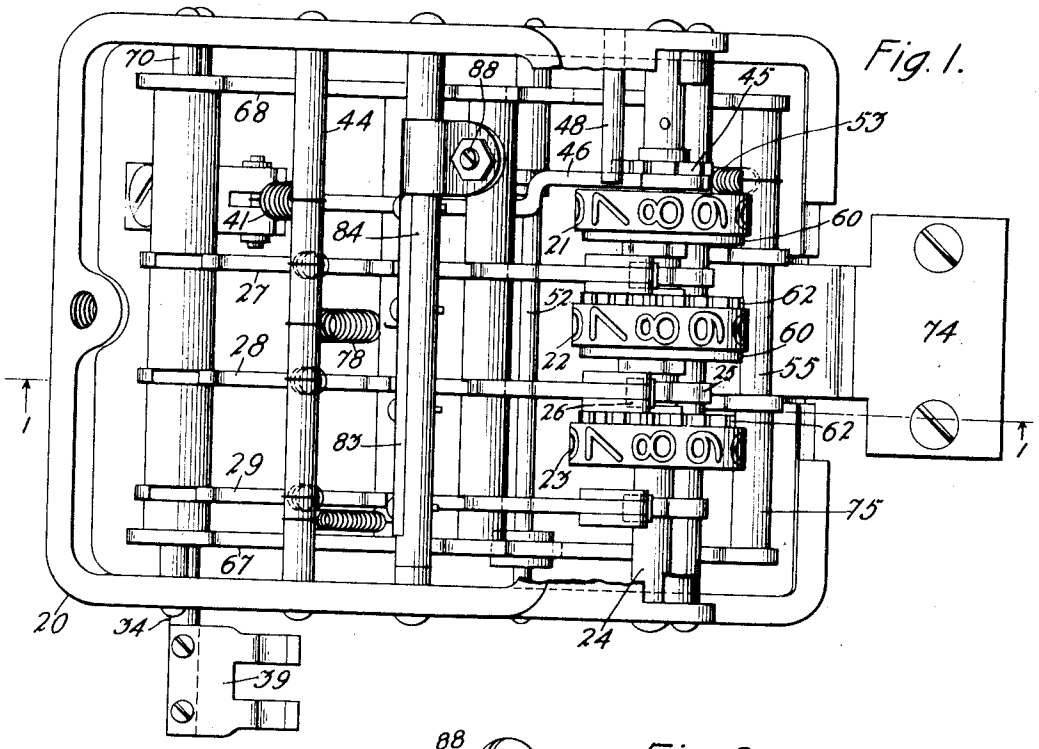
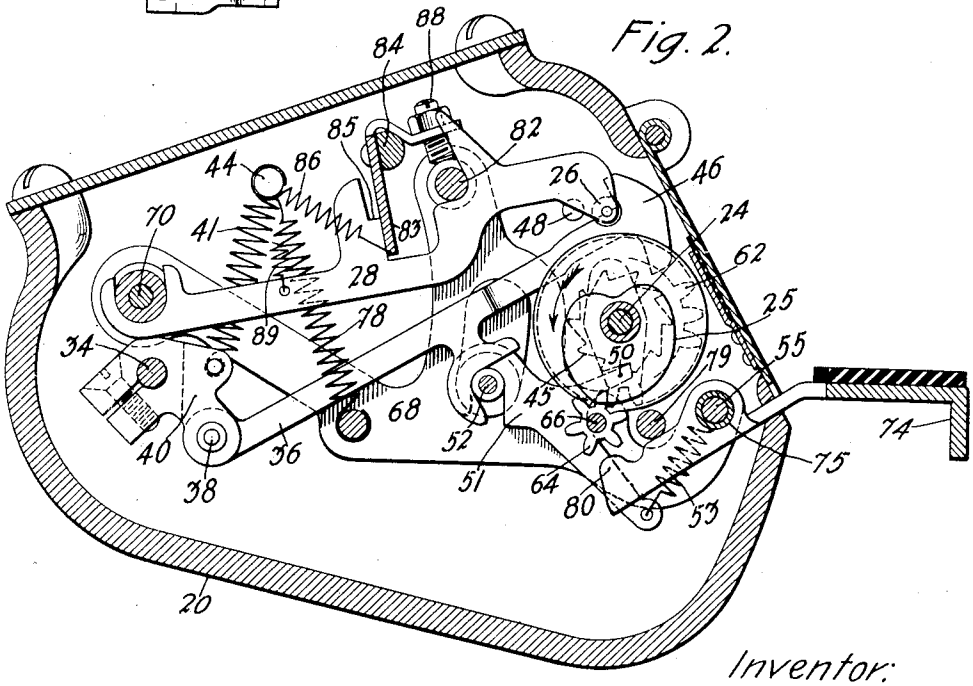


Fig. 2.



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UNITED STATES PATENT OFFICE.

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COUNTING APPARATUS.

1,356,607. Specification of Letters Patent. Patented Oct. 26, 1920.

Application filed September 13, 1916. Serial No. 119,856.

To all whom it may concern:

Be it known that I, AMOS F. DIXON, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Counting Apparatus, of which the following is a full, clear, concise, and exact description.

This invention relates to registering or counting apparatus such as used for recording numbers of words, characters, messages, etc. The apparatus is particularly adapted for use with keyboard machines such as typewriters, perforators and the like, but may also be used in many other fields.

Registers or counters heretofore provided have been open to the objection that when the digit or character wheels are reset, the vibration or jar of the resetting mechanism frequently causes the wheels to move out of their proper zero or normal positions, thereby giving a false initial reading. This condition, if not noticed or corrected before the counter is started in operation, will give inaccurate results.

The principal object of this invention is to overcome the above objection and to provide reliable means for insuring positive action of the register wheels at all times.

The above and other objects of this invention will be fully set forth in the following description and claims, and will be more readily understood by reference to the accompanying drawing, in which:

Figure 1 is a plan view of the counting mechanism with the cover plate removed, and Fig. 2 is a sectional view on line 1—1 of Fig. 1.

The counter may be operated directly from the key-board of a typewriter in the usual manner, or may be operated indirectly from such a key-board by means of an electromagnet arranged as disclosed in a copending application, Serial No. 30,004, filed May 24, 1915.

The mechanism is all inclosed in a suitable casing 20, which also furnishes suitable bearings for the various shafts and supporting rods. The count is made on a plurality of character or digit wheels, 21, 22 and 23, on each of which numerals from 0 to 9 appear around the periphery thereof as shown in Fig. 1. These wheels 21, 22 and 23 are loosely mounted on a non-rotatable shaft 24, and are properly spaced from each other and from the frame 20 by suitable collars carried by the shaft. To each digit wheel is rigidly secured a heart-shaped cam 25 as best shown in Fig. 2. Each cam 25 is adapted to be engaged by a roller 26, carried by an individual lever 27, 28 or 29, to rotate the corresponding cam and thereby restore the wheels to normal position as will be hereinafter more fully explained.

The advance rotary motion is imparted to number wheels 21, 22 and 23 from a shaft 34 through the agency of an actuator 36. This actuator is pivoted at 38 to a bell crank lever 40 carried by shaft 34 and is normally held in the position indicated in Fig. 2 by means of a spring 41 attached to lever 40 and to a rod 44 extending between the end walls of casing 20. The free end of actuator 36 is provided with a double ended pawl 46, which, when shaft 34 is rotated, engages and rotates a ratchet wheel 45 rigidly secured to one side of the units wheel 21. When the pawl 46 is moved to engage a tooth of the ratchet wheel 45 the units wheel 21 is rotated in the direction of the arrow, Fig. 2, until the upwardly projecting end of pawl 46 engages a stop pin 48 secured to the frame 20. When this position is reached, the units wheel has been rotated sufficiently to exhibit the next higher digit, and the actuator is held firmly against the ratchet wheel 45 by means of the stop pin 48 until the lever 34 is released, whereupon the actuator 36 is returned to normal by spring 41. It will, therefore, be seen that for each step, the ratchet wheel is stopped positively and the overthrow of the wheel is prevented.

The ratchet wheel is prevented from rotating backward, while the actuator is being moved back in readiness to make the next step, by a holding pawl 50 forming a part of a member 51. The member 51 is hinged at one end on a shaft 52, the opposite end being provided with a spring 53 which is attached to a shaft 55. In this way, the pawl 50 is normally held in engagement with the ratchet wheel, but may be disconnected therefrom in the resetting operation as will be hereinafter described.

For the purpose of enabling the count to be kept by the mechanism and recorded in units, tens and hundreds, means are pro-

vided whereby, at the proper time, motion is imparted by each number wheel to the next succeeding or higher digits wheel. These means comprise gear wheels 60, each provided with only two teeth which are adjacent to each other, secured to each of the number wheels except the last. Each digit wheel except the first is provided with a gear wheel 62 which has as many teeth as there are numerals or characters upon its corresponding digit wheel, in the structure shown there being ten such teeth. Coöperating with each adjacent pair of gear wheels 60 and 62 is a double pinion 64 whose teeth are adapted to engage the teeth of both gear wheels. Since, however, there are but two adjacent teeth on each of wheels 60, it is only once during each revolution of units wheel 21 that motion will be imparted to tens wheel 22, and similarly only once during each revolution of the tens wheel 22 that a step will be imparted to hundreds wheel 23. It is, therefore, apparent that for every ten steps of units wheel 21, the tens wheel 22 will be rotated one step, and for every ten steps of tens wheel 22, the hundreds wheel 23 will be rotated one step. While only three digit wheels are shown, this number may be increased as desired. The two double pinions 64 are loosely mounted upon a shaft 66 which is carried by and between two bracket arms 67 and 68. These bracket arms are pivotally secured to a shaft 70 journaled in the sides of the casing 20.

In order that the apparatus may be reset after counting the words or characters of a message, means is provided under the control of the operator for simultaneously withdrawing the pinions 64 from engagement with the gear wheels 60 and 62, and for returning the numeral wheels to normal or zero position. This means comprises a manually controlled reset lever 74 which is carried by the shaft 55, mounted on the free ends of the levers 67 and 68. Lever 74 is provided with two pinion holding pawls 80, (only one of which can be seen in Fig. 2) which, when the lever is depressed are moved between the teeth of one of the double portions of each of the pinions 64 to prevent their rotation during resetting. Normally, the free ends of levers 67 and 68 are held in an elevated position by means of springs 78, the ends of which are secured to the rod 44, so that a stop rod 79 is engaged by a portion of pawls 80 to remove these pawls from between the teeth of pinions 64 as shown in Fig. 2. Upon the completion of a count the operator depresses lever 74 which moving about shaft 55 and also shaft 70, brings it upwardly, extending pawls 80 into engagement with the pinions 64. Further depression of the lever 74 moves levers 67 and 68 downward against the action of springs 78 and causes rod 82 carried by these levers to depress the levers 27, 28 and 29 until the rollers 26 carried thereby engage and rotate the heart-shaped cams. The cams are thus rotated until rollers 26 engage their lowest portions, whereupon all of the digit wheels are in normal or zero position and ready for starting a new count.

In order to prevent the digit wheels prematurely moving out of their zero position means are provided to insure their being held in the reset position until pinions 64 reëngage gear wheels 60 and 62, in which positions the pinions, unless positively advanced as hereinbefore described, prevent the digit wheels from rotating. A bell crank lever 83 pivotally mounted on a shaft 84 is adapted to engage shoulders 85 of levers 27, 28 and 29 when these levers are in their lowest depressed position. The lever 83 is brought into engagement with the shoulders 85 when the levers 27, 28 and 29 are depressed, by means of a spring 86, one end of which is connected to the rod 44. The purpose of this lever 83 is to hold the rollers 26 in engagement with the heart-shaped cams and thereby prevent the digit wheels from rotating or being jarred out of position until the pinions 64 are returned into engagement with the gear wheels 62. As soon as the lever 74 is allowed to return, under the action of springs 78, so that the pinions 64 engage the gear wheels 62, the shaft 82 engages an adjustable stop pin 88 carried by the bell crank lever 83 and trips the lever out from engagement with the shoulders 85 on levers 27, 28 and 29, thereby allowing these levers to return to normal position under the influence of springs 89 which are also attached to rod 44. The stop pin 88 is adjustable to allow for wear and change in the surface or shape of the rollers 26 and the heart-shaped cams 25, so that the levers 27, 28 and 29 will not be released and consequently the digit wheels will not be free to rotate before the pinions 64 are again brought into engagement with the gear wheels 62, thereby insuring at all times against any possibility of the number wheels getting out of position and indicating an incorrect count.

What is claimed is:

1. A counting apparatus comprising a plurality of register wheels, an actuator for effecting the rotation of said wheels, a cam carried by each wheel, a system of levers coöperating with said cams to return the wheels to zero position, means for operating said system of levers, and means independent of said last mentioned means for automatically locking said system of levers until and releasing said mechanism when said operating means is returned to normal condition.

2. A counting apparatus comprising a

plurality of register wheels, an actuator for effecting the rotation of said wheels, a cam carried by each wheel, a system of levers coöperating with said cams to return the wheels to zero position, a single lever for operating said system of levers, a locking lever coöperating with said system of levers and adapted to automatically lock said system of levers until and release said system of levers when the operating lever is returned to normal condition.

In witness whereof, I hereunto subscribe my name this 12th day of September, A. D. 1916.

AMOS F. DIXON.