Jan. 2, 1945. M. L. NELSON 2,366,422

COUNTING DEVICES

Filed Dec. 17, 1941

Fig. 1.

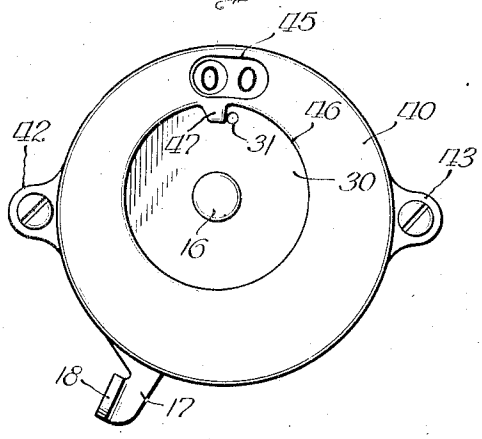


Fig. 2.

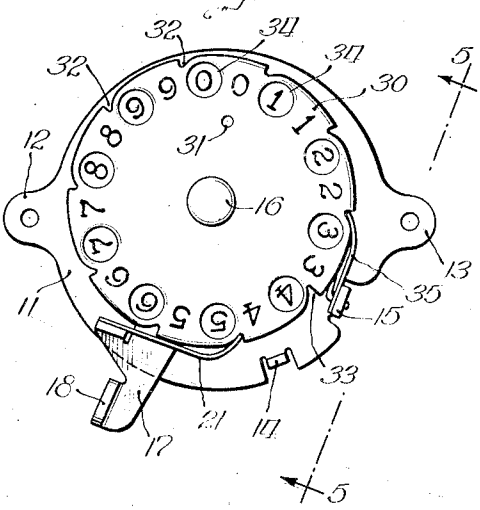


Fig. 3.

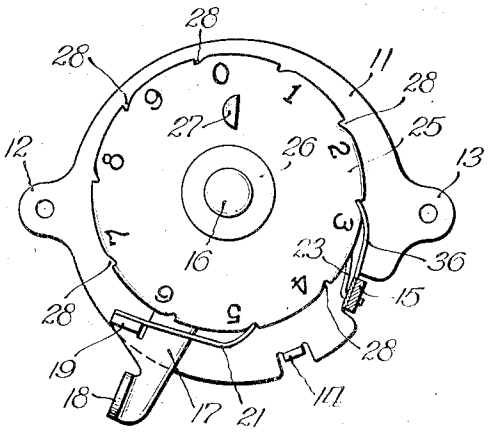


Fig. 4.

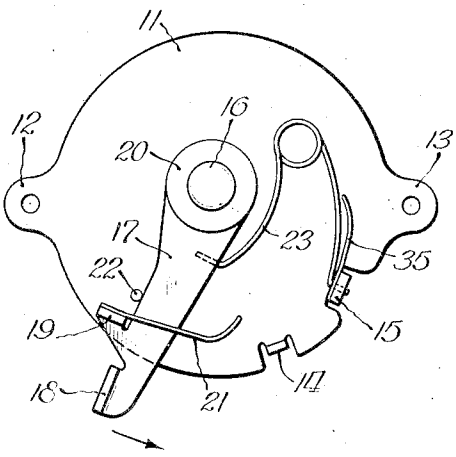
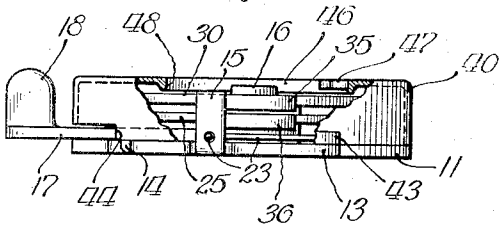


Fig. 5.



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Patented Jan. 2, 1945 2,366,422

UNITED STATES PATENT OFFICE

2,366,422

COUNTING DEVICE

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Application December 17, 1941, Serial No. 423,343

2 Claims. (Cl. 235—116)

The present invention relates in general to counters or counting devices, and the object of the invention is to produce a new and improved device of this character.

A special object of the invention is to produce a counter which is small and compact, has a minimum number of parts, and is economical to manufacture.

The invention and various features thereof will be described hereinafter with reference to the accompanying drawing, in which—

Fig. 1 is a top or plan view of a counter constructed in accordance with the invention;

Fig. 2 is a similar view with the cover removed to expose the units number wheel;

Fig. 3 is another similar view with the units number wheel removed to show the tens number wheel;

Fig. 4 is a view showing the base, the finger lever, and other parts; and

Fig. 5 is a side view with part of the cover broken away to show the detents for the number wheels.

Referring to the drawing, the various parts of the counter are mounted on the base plate 11, which is generally circular in shape and is provided with the two ears 12 and 13. The base plate may be stamped from heavy sheet brass or other suitable material. The stop 14 and the support 15 on which the number wheel detents are mounted are formed integrally with the base plate 11, as indicated in Fig. 4.

The reference character 16 indicates a round stud or post which projects upward from the base plate 11 and is rigidly secured thereto in any suitable manner. The post 16 may, for example, be made with a shoulder which rests against the upper side of the base plate and a short section of smaller diameter which extends through a hole in the base plate and affords means for attaching the post to the base plate by a riveting operation. It should be noted that the post 16 is not centrally located with respect to the base plate 11 but is offset upward and to the left as the parts are seen in Fig. 4. The reason for the eccentric location of the post is to provide space inside the cover for the driving pawl 21 and detents 35 and 36.

The finger lever 17, Fig. 4, is pivoted at one end on the post 16 and at the other end has an integrally formed upwardly projecting portion 18 which provides a finger hold. Another integrally formed upwardly projecting part 19 constitutes a support for the driving pawl 21. The pawl is preferably made of some resilient material such as spring bronze, for example, and may be soldered to the support 19. The spring 23 has one end anchored at the support 15, while the other end enters a hole drilled in the edge of the finger lever. The spring 23 holds the finger lever in retracted position against the stop 22, which may be a pin projecting a short distance upward from the base plate 11. The finger lever is movable in the direction of the arrow until it engages the stop 14, and when released is returned by the spring 23 to the position in which it is shown.

Above the finger lever 17 there is a spacing washer 20 on the post 16, as indicated in Fig. 4. A separate washer may be used, or the finger lever may be made with an upwardly extending hub which serves the same purpose.

The reference character 25, Fig. 3, indicates the tens number wheel, which may be an aluminum disk having a central aperture therein of the proper size to fit the post 16. The number wheel is rotatable on the post 16 and rests on the washer or hub 20. Extending around the periphery of the number wheel 25 there is a row of ten equally spaced notches 28. The digits 1, 2, 3, etc. are arranged in a circular row on the upper side of the number wheel near the edge and may be provided in any suitable manner. The digits may be stamped in the metal disk, for example, and filled with some black pigment.

Above the tens number wheel 25 there is a thin washer 26. The number wheel 25 is provided with a semi-circular stud or post 27 which projects upward from the surface of the number wheel disk. The height of the stud 27 is equal to or slightly less than the thickness of the washer 26.

The reference character 30, Fig. 2, indicates the units number wheel, which may be an aluminum disk slightly larger in diameter than the tens number wheel disk 25. The units number wheel is rotatable on the post 16 and rests on the washer 26.

As in the case of the tens number wheel, there is a row of equally spaced notches around the periphery of the units number wheel. There are nine notches 32 which are relatively shallow, the bottoms of these notches being located on a circle which has a diameter slightly greater than the diameter of the tens number wheel. The tenth notch 33 is deeper and overlaps one of the notches in the tens number wheel.

The units number wheel 30 is also provided with a row of digits 1, 2, 3, etc., which may be stamped in the metal disk as in the case of the digits which appear on the tens number wheel.

Alternating with the digits on the units number wheel are ten openings **34** through which the digits on the tens number wheel are visible.

There is a small hole **31** drilled in the units number wheel substantially on the same radius as the digit 0. This hole is provided for the purpose of restoring or resetting the number wheels to zero, as will be subsequently explained.

It will be understood that the units number wheel is advanced by the pawl **21** responsive to the operation of the finger lever **17**. The pawl **21** spans both number wheels, but the notches **32** in the periphery of the units number wheel are not deep enough to permit the pawl to engage the notches **28** in the tens number wheel. The units number wheel may therefore be advanced independent of the tens number wheel. When the pawl **21** drops into the deep notch **33**, however, it also enters one of the notches **28** and on the subsequent operation of the finger lever both number wheels are advanced.

Retrograde movement of the number wheels is prevented by the two detents **35** and **36**, which engage the notches in number wheels **30** and **25**, respectively. These detents may be made of spring bronze and are mounted on the support **15**. The detents **35** and **36** not only prevent backward rotation of the number wheels but also oppose the forward rotation thereof to a certain extent, especially at the start of such forward rotation. This is of importance in the case of the tens number wheel **25**, which is held stationary by detent **36** during the rotation of the units number wheel **30**, except of course at times when the pawl **21** is in engagement with notches in both wheels.

The parts are enclosed in a cover **40**, shown in Figs. 1 and 5. The cover **40** is a shallow cup-shaped member having the same diameter as the base plate **11**, and is preferably formed from a metal blank by a drawing operation. The open end of the cover rests against the base plate. Two ears **42** and **43** may be provided, corresponding to ears **12** and **13** on the base plate, whereby the cover and base plate may be secured together by screws. The cover may, however, be secured to the base plate in any suitable manner.

A portion of the lower edge of the cover adjacent the base plate is cut away as indicated at **44**, Fig. 5, to provide a slot for the finger lever **17**. There is an oblong window **45**, Fig. 1, in the top of the cover through which one of the tens digits and one of the units digits may be observed. There is also a large circular opening **46** in the top of the cover which is concentric with the post **16** and exposes a large part of the units number wheel **30**. This opening is provided to afford access to the hole **31** in the units number wheel during the resetting operation. A stop **47** which functions in the resetting operation is also provided and is preferably formed integrally with the cover.

The cover **40** not only protects the number wheels and other parts, but also serves to retain the number wheels and the finger lever in the proper position adjacent each other on the post **16**. To this end the material of the cover around the large opening **46** is depressed to form an annular rim or bead **48**. The parts are so constructed that when the cover is assembled on the base plate the bead **48** very nearly touches the upper or units number wheel **30**. This arrangement avoids the necessity of providing any retaining means on the post **16**.

The operation of the counter may now be explained. For this purpose it may be assumed that the counter is set to zero, as shown in Fig. 1. The digit 0 on the tens number wheel **25** appears at the left in the window **45**, being visible through one of the openings **34** in the units number wheel, and the digit 0 on the units number wheel appears in the window **45** at the right.

To operate the counter the finger lever is moved to the right until it engages the stop **14** and is then released. The spring **23** returns the finger lever to normal position. The forward movement of the finger lever advances the units number wheel **30** through the medium of the pawl **21** and the number wheel is retained in advanced position by the detent **35**. The digit 1 now appears in the window **45** at the right, or in the units position. The tens number wheel **25** remains undisturbed, due to the fact that the pawl **21** advanced the units number wheel by means of one of the shallow notches **32**. The digit 0 therefore continues to be displayed in the tens position at the window **45**.

Additional operations of the finger lever **17** advance the units number wheel **30** step by step in the same manner, and the digits 2, 3, 4, etc. are successively displayed in the units position at the window **45**. Eventually the digit 9 will appear and at this time, when the finger lever is restored, the pawl **21** drops into the deep notch **33** of the units number wheel. Upon the next operation of the finger lever, therefore, the pawl **21** engages one of the notches **28** of the tens number wheel **25** also and both number wheels are advanced, with the result that the digit 1 is displayed in the tens position and the digit 0 in the units position.

The counting may continue as described, the units number wheel being advanced at each operation of the finger lever and the tens number wheel being advanced at each tenth operation of the finger lever, or once for each complete rotation of the units number wheel. The capacity of the counter is, of course, limited to the capacity afforded by two number wheels; that is, the largest number which can be registered is 99. The next operation of the finger lever after this number appears restores the counter to zero.

The counter may be reset to zero at any time, the resetting operation differing, however, depending on whether the tens digit is larger than the units digit or not.

In order to explain the first case it may be assumed that the number registered is 21. With the number wheels in the proper position to display this number the stud **27** on the tens number wheel **25** has been rotated in a counter-clockwise direction $\frac{2}{10}$ of a complete rotation, or 72 degrees, while the hole **31** in the units number wheel **30** has been advanced 36 degrees in the same direction, as will be readily understood from inspection of Figs. 2 and 3. The hole **31** is therefore in the rear of stud **27**, as regards the forward movement of the number wheels. Any suitable pin or rod may now be inserted in the hole **31**, and by this means the units number wheel may be rotated in a counter-clockwise direction until the pin engages the stop **47**. The units number wheel will now display the digit 0 in the window **45**, as will be clear from Fig. 1. During the rotation of the units number wheel the pin engages the stud **27** on the tens number wheel, and accordingly this number wheel is rotated also. The stud **27** is so located that when the pin engages the stop **47** the tens digit 0 is displayed at window **45**.

As an example of the second case, it may be assumed that the number registered is 12. When the number wheels display this number the units number wheel 30 is farther advanced than the tens number wheel and the hole 31 is ahead of the stud 27. Now when the pin is inserted in hole 31 and the units number wheel is restored to normal the pin does not engage stud 27 and the tens number wheel is not restored. The number 10 is accordingly displayed at window 45. The operator now operates the finger lever 17 once, thereby changing the registration to the number 11. In the advance of the units number wheel from 0 to 1 the hole 31 moves to the left of the stop 47 to a position just to the rear of stud 27, as will be appreciated from the drawing. Figs. 2 and 3 show that when both number wheels display the digit 0, the forward edge of hole 31 is in alignment with the flat side of the stud 27, and the relative location of hole 31 and stud 27 is, of course, the same when any other digit is displayed by both wheels. Now if the pin is again inserted in hole 31, both number wheels can be simultaneously rotated to normal or zero position.

In connection with the foregoing it may be mentioned that the counter is especially designed for use with a small home knitting machine known as the "Pikloom." In the operation of this machine a hook made of stiff wire or rod is employed, and the straight end of this hook serves well for the purpose of resetting the counter. When the counter is sold for use in other situations a suitable short wire or rod may be furnished, if desired, although the user will generally be able to find something at hand that will operate satisfactorily.

The invention having been described, that which is believed to be new and for which the protection of Letters Patent is desired will be pointed out in the appended claims.

I claim:

1. In a counter, a base plate, a post projecting upward from said plate, a finger lever and a plurality of number disks rotatably mounted on said post in superimposed relation, a cup-shaped cover cooperating with said base and having an opening which provides an annular space surrounding said post, and a depressed annular bead formed in the top of said cover concentric with said post and in close proximity to the upper one of said number disks, whereby the said disks and finger lever are retained in operative position on said post.

2. In a counter, a base plate, a post projecting upward from said base plate, a finger lever and a plurality of number disks rotatably mounted on said post in superimposed relation, a generally cup-shaped cover mounted on said base plate in inverted position relative thereto and enclosing said number disks, and an annular bead projecting from the bottom of said cover, said bead being disposed concentric with said post but radially spaced therefrom, the face of said bead being axially in close proximity to the upper one of said disks for retaining said disks and said finger lever in operative position on said post.

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