Aug. 27, 1946. J. WEIMONT 2,406,726

COUNTING MECHANISM

Filed Aug. 25, 1944 3 Sheets-Sheet 1

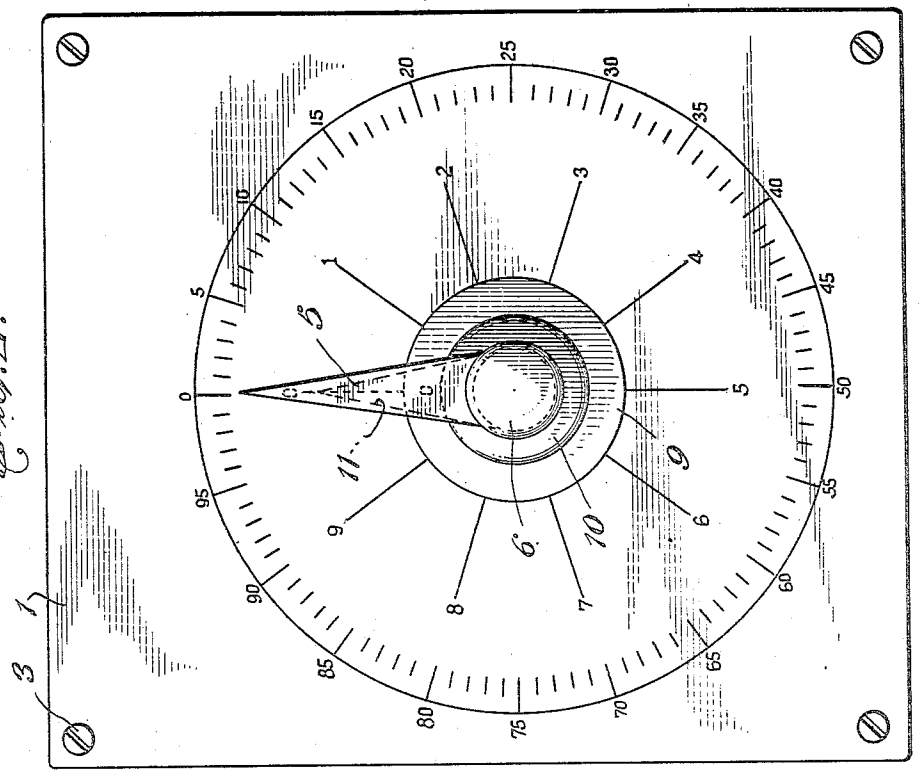


Fig. 2.

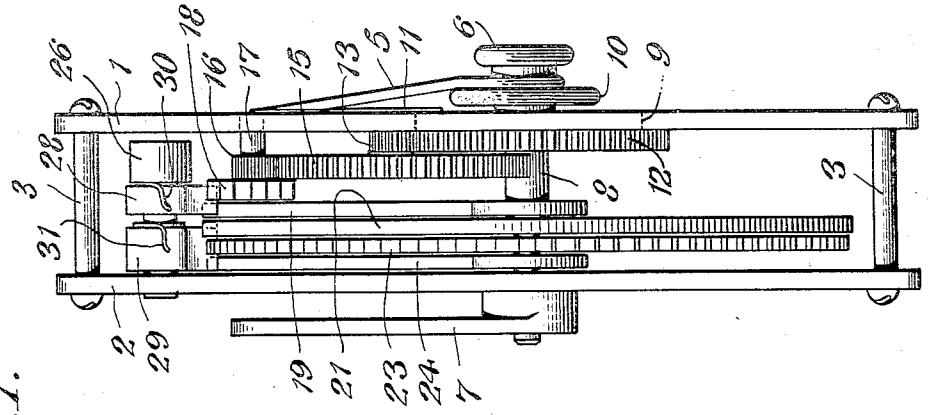


Fig. 1.

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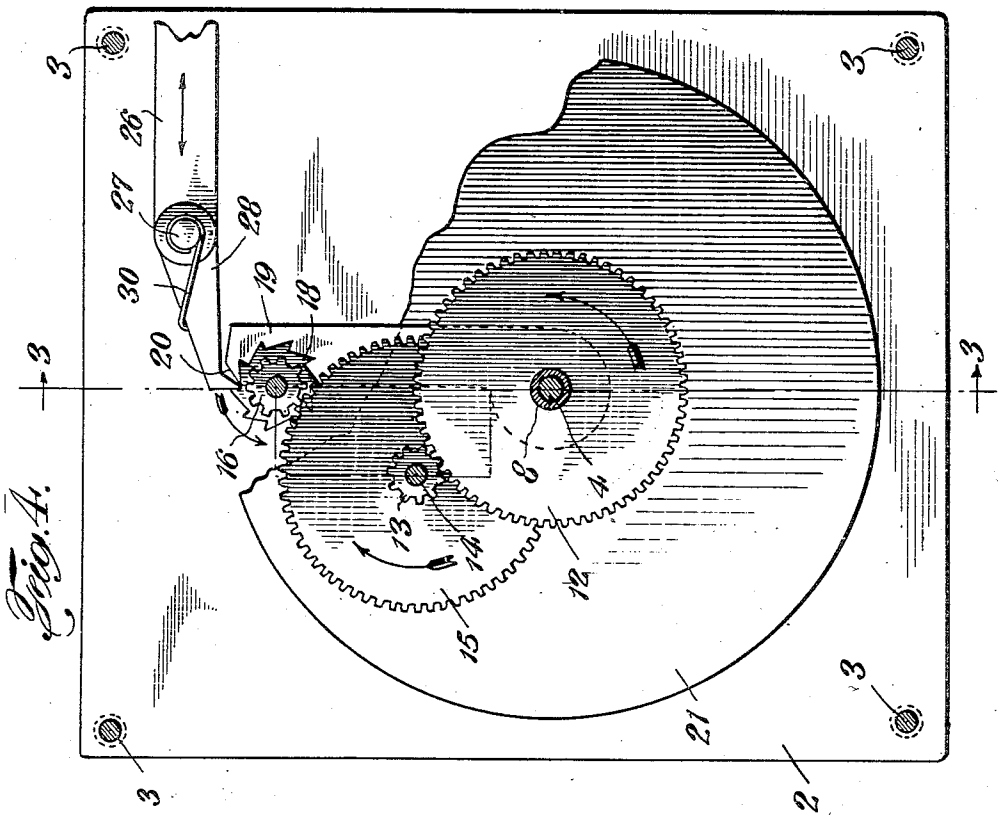


Fig. 4.

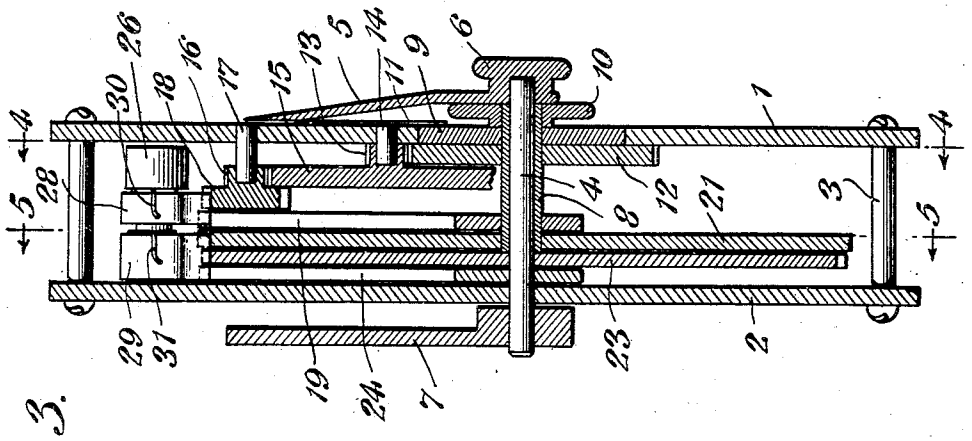


Fig. 3.

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Fig. 5.

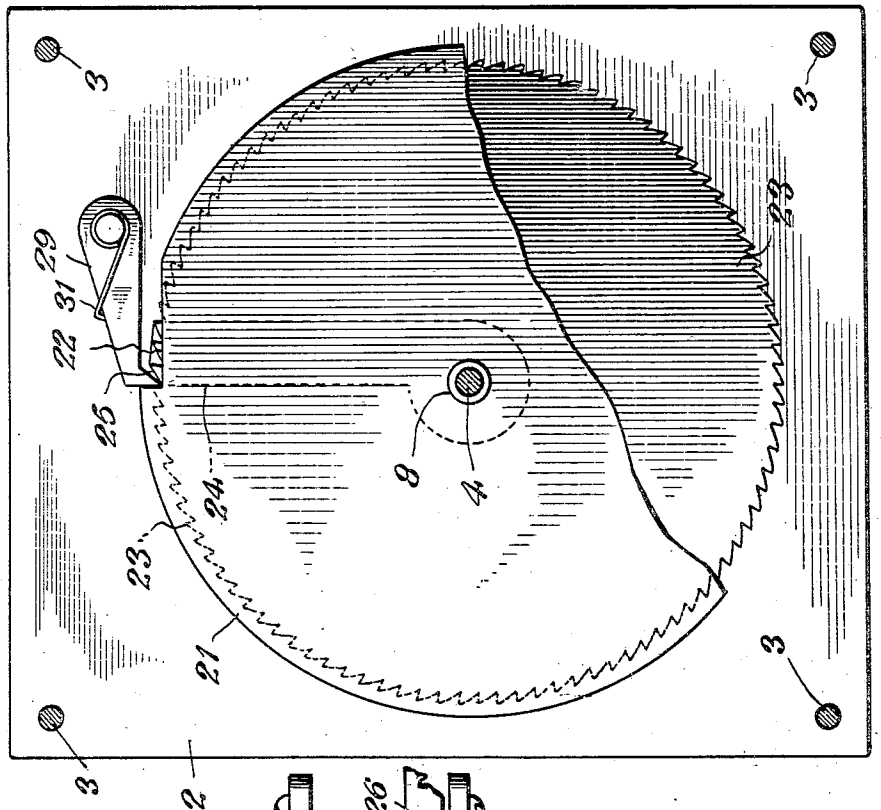
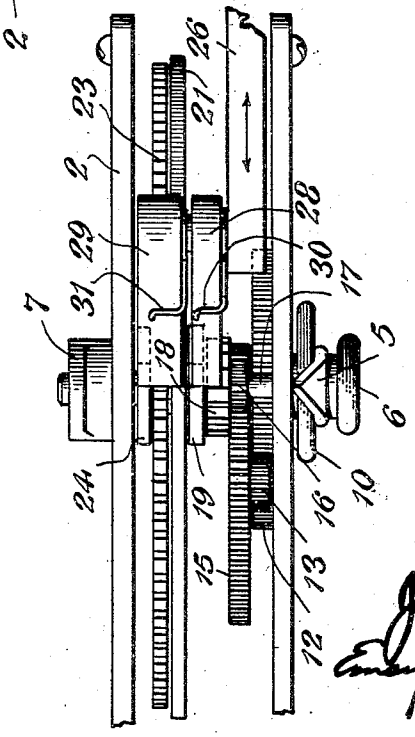


Fig. 6.



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COUNTING MECHANISM

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5 Claims. (Cl. 235—132)

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This invention relates to counting mechanisms.

In the operation of many types of machines, it is desirable to set the machine to perform a predetermined number of operations, and to stop the machine or certain parts thereof automatically when the predetermined number of operations has been performed. For example, in price tag marking machines it is frequently desirable to print a predetermined number of price tags with identical indicia. It is desirable, therefore, to be able to set the machine to print the exact number required. Furthermore, it is frequently desirable to print successive lots of tags of varying quantity. It is desirable, therefore, to be able to change the setting easily and quickly.

It is an object of the invention to provide a counting mechanism of this nature, which is simple in construction and accurate in operation.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawings, in which,

Figure 1 is an end elevation.

Figure 2 is a front elevation.

Figure 3 is a section on the line 3—3 of Figure 4.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a section on the line 5—5 of Figure 3.

Figure 6 is a top plan view.

Referring to the drawings, the counting mechanism is supported in any suitable manner, as by a frame consisting of parallel plates 1 and 2 held together in spaced relationship by bolts 3. A shaft 4 passes through said plates, which said shaft has a pointer 5 and operating knob 6 secured to one end and a lever 7 secured to its other end. The said lever 7 may be called an actuator since it is adapted to actuate a suitable member such as a switch, clutch or other suitable device when the predetermined number of operations have been completed. The shaft 4 also carries a coaxial tubular shaft 8 which is rotatable thereon, and the shaft 8 has a disk 9 and an operating knob 10 secured thereto. The disk 9 carries a pointer 11.

As shown in Figure 2, the plate 1 is inscribed with two dials. An outer dial, which may be described as the units and tens or lower order dial, is inscribed in equally spaced divisions indicating units from 0 to 99, and is located to cooperate with the lower order pointer 5. The inner dial, which may be described as the hundreds or higher order dial, is divided in equally spaced divisions from 0 to 9 (ciphers omitted), and is located to cooperate with the higher order pointer 11. By moving

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the pointers 5 and 11 by means of their respective knobs 6 and 10, the pointers may be set to indicate any desired number from 0 to 999, and at the same time, through the rotation of shafts 4 and 8 as the knobs are turned, the mechanism is set, as hereinafter described, to bring the actuator 7 to actuating position on completion of the number of operations indicated by the setting of the pointers.

For this purpose a gear 12 is secured to shaft 8, which gear meshes with small gear 13 mounted on a stud shaft 14 in plate 1. Gear 13 is preferably formed integrally with larger gear 15 which meshes with small gear 16 mounted on stud shaft 17 in plate 1. Gear 16 is preferably formed integrally with ratchet 18. In the embodiment illustrated, where the inner dial is a hundreds dial, the gear reduction effected by the gear train 16, 15, 13, 12 should be 100 to 1, so that if the ratchet 18 is provided with 10 teeth, it would require the motion of 1000 ratchet teeth to complete one revolution of gear 12 and pointer 11 which moves therewith. This may be done by forming 10 teeth in gear 16, 100 teeth in gear 15, 10 teeth in gear 13 and 100 teeth in gear 12.

Secured to the shaft 8 is an arm 19 having a beveled end surface 20 serving as a cam for purposes hereinafter described, and also secured to the shaft 8 is a disk 21 having a notch 22 in its periphery. Secured to the shaft 4 is a ratchet disk 23 having 100 ratchet teeth and also secured to the shaft 4 is an arm 24 having a beveled end surface 25 serving as a cam for purposes hereinafter described. The arm 24 and the arm 19 are identical and serve similar purposes.

The parts previously described are operated by a reciprocating bar 26 which may be connected in any suitable manner to the machine whose operations are to be counted. The end of said bar carries a stud 27 on which are pivotally mounted a pair of pawls 28 and 29, which said pawls are held in yielding engagement with the ratchets 18 and 23 respectively by springs 30 and 31.

The pawl 28 is of a width sufficient to straddle the ratchet 18 and the arm 19, so that whenever, in the operation of the mechanism, the arm 19 is in the position shown in Figure 4, reciprocation of the bar 26 causes the pawl 28 to ride on the cam surface 20 without actuating the ratchet 18. On the other hand, whenever the arm 19 is moved away from the position shown in Figure 4, as by turning the knob 10, the pawl 28 will engage the ratchet 18 to advance the same one tooth for each stroke of the bar 26.

Similarly, the pawl 29 is of a width sufficient

to straddle not only the ratchet 23 and the arm 24, but also the disk 21. As a result, whenever the arm 24 is in the position shown in Figure 5, reciprocation of the bar 26 causes the pawl 29 to ride on the cam surface 25 without actuating the ratchet 23. On the other hand, neglecting for the moment the effect of the disk 21, whenever the arm 24 is moved away from the position shown in Figure 5, as by turning the knob 6, the pawl 29 may engage the ratchet 23 to advance the same one tooth for each stroke of the bar 26. However, it will be observed that the periphery of the disk 21 engages the pawl 29 and prevents it from engaging the ratchet 23 at all times except when said disk occupies the position shown in Figure 5 with the notch 22 in position to allow the pawl 29 to engage the ratchet 23. Thus, in order for the pawl to engage the ratchet 23 to advance the same the arm 24 must be out of the position shown in Figure 5 and the disk 21 must be in the position shown in Figure 5.

It will be understood that the notch 22 and the disk 21 will occupy the position shown in Figure 5 only when the pointer 11 is in the "0" position. Consequently, it will be seen that the ratchet 23 can be advanced only after the disk 21 and pointer 11 have been returned to the "0" position from any position to which they may have been set by the knob 10. The disk 21, therefore, constitutes means for preventing advancement of the ratchet 23 until after the hundreds mechanism has been returned to the "0" position.

With this in mind, the operation of the mechanism may now be explained. Let it be assumed that it is desired to set the mechanism to stop the machine to which it is attached after 675 operations have been performed. The knob 10 is turned in counterclockwise direction until the pointer 11 points exactly to the dial line 6 on the inner dial. Then the knob 6 is turned in counterclockwise direction until the pointer 5 points exactly to the dial line 75 on the outer dial. When the knob 10 is so turned, it will be understood that the arm 19 and the disk 21 are also turned to move the arm away from the position shown in Figure 4 to permit the pawl 28 to engage the ratchet 18, and to move the notch 22 away from the position shown in Figure 5 to prevent the pawl 29 from engaging the ratchet 23. As the bar 26 reciprocates, the ratchet 18 is advanced one tooth at a time thus gradually turning the shaft 8 and its connected parts, including the arm 19 and disk 21 toward the "0" position by means of the gears 16, 15, 13 and 12.

On the 600th stroke of the bar 26 said parts will have been restored to the "0" position thus bringing the arm 19 to position to prevent further advancement of the ratchet 18 by the pawl 28, and at the same time bringing the notch 22 to position to permit the pawl 29 to engage the ratchet 23. As the bar 26 continues to reciprocate, therefore, the ratchet 23 is advanced one tooth at a time, thus gradually turning the shaft 4 and its connected parts including the arm 24 and lever 7 to the "0" position. On the 675th stroke of the bar 26, the lever 7 will have been brought to position to actuate its connected mechanism. In the event that the nature of the connected mechanism is such as to stop only a portion of the machine, while permitting the bar 26 to continue to reciprocate, it will be noted that the pawls 28 and 29 will ride on the cam surfaces 20 and 25 of the arms 19 and 24 respectively so that the counter mechanism will not move further.

It will be understood that the invention may be variously modified and embodied within the scope of the subjoined claims.

I claim as my invention:

1. A counter mechanism comprising, a higher order pointer, a lower order pointer, means including a ratchet and pawl for restoring said higher order pointer to zero position from any indicating position to which it may have been set, means including a ratchet and pawl for restoring said lower order pointer to zero position from any indicating position to which it may have been set, common means for actuating said pawls, means for preventing operation of the lower order ratchet by its pawl until said higher order pointer has been restored to zero position, and means for preventing further operation of the higher order ratchet by its pawl after said higher order pointer has been restored to zero position.

2. A counter mechanism comprising, a higher order pointer, a lower order pointer, means including a ratchet and pawl for restoring said higher order pointer to zero position from any indicating position to which it may have been set, means including a ratchet and pawl for restoring said lower order pointer to zero position from any indicating position to which it may have been set, common means for actuating said pawls, means for preventing operation of the lower order ratchet by its pawl until said higher order pointer has been restored to zero position, means for preventing further operation of the higher order ratchet by its pawl after said higher order pointer has been restored to zero position, and means for preventing further operation of the lower order ratchet by its pawl after said lower order pointer has been restored to zero position.

3. A counter mechanism comprising, a higher order pointer, a lower order pointer, means including a ratchet and pawl for restoring said higher order pointer to zero position from any indicating position to which it may have been set, means including a ratchet and pawl for restoring said lower order pointer to zero position from any indicating position to which it may have been set, common means for actuating said pawls, a shaft supporting said higher order pointer, a coaxial shaft supporting said lower order pointer, and a disk mounted on the shaft supporting said higher order pointer, said disk having a cam surface engaging said lower order pawl to prevent operation of said lower order ratchet until said higher order pointer has been restored to zero position, and means for preventing further operation of the higher order ratchet by its pawl after the higher order pointer has been restored to zero position.

4. A counter mechanism comprising, a higher order pointer, a lower order pointer, means including a ratchet and pawl for restoring said higher order pointer to zero position from any indicating position to which it may have been set, means including a ratchet and pawl for restoring said lower order pointer to zero position from any indicating position to which it may have been set, common means for actuating said pawls, a shaft supporting said higher order pointer, a coaxial shaft supporting said lower order pointer, a disk mounted on the shaft supporting said higher order pointer, said disk having a cam surface engaging said lower order pawl to prevent operation of said units ratchet until said higher order pointer has been restored to zero position, and an arm mounted on the shaft supporting

said higher order pointer, said arm having a cam surface engaging said higher order pawl to prevent operation of said higher order ratchet after said higher order pointer has been restored to zero position.

5. A counter mechanism comprising, a higher order pointer, a lower order pointer, means including a ratchet and pawl for restoring said higher order pointer to zero position from any indicating position to which it may have been set, means including a ratchet and pawl for restoring said lower order pointer to zero position from any indicating position to which it may have been set, common means for actuating said pawls, a shaft supporting said higher order pointer, a coaxial shaft supporting said lower

order pointer, a disk mounted on the shaft supporting said higher order pointer, said disk having a cam surface engaging said lower order pawl to prevent operation of said lower order ratchet until said higher order pointer has been restored to zero position, an arm mounted on the shaft supporting said higher order pointer, said arm having a cam surface engaging said higher order pawl to prevent operation of said higher order ratchet after said higher order pointer has been restored to zero position, and means for preventing further operation of the lower order ratchet by its pawl after said lower order pointer has been restored to zero position.

JOSEPH WEIMONT.