Feb. 3, 1942. R. F. SHOUP 2,271,958

VOTING MACHINE

Filed Jan. 16, 1941

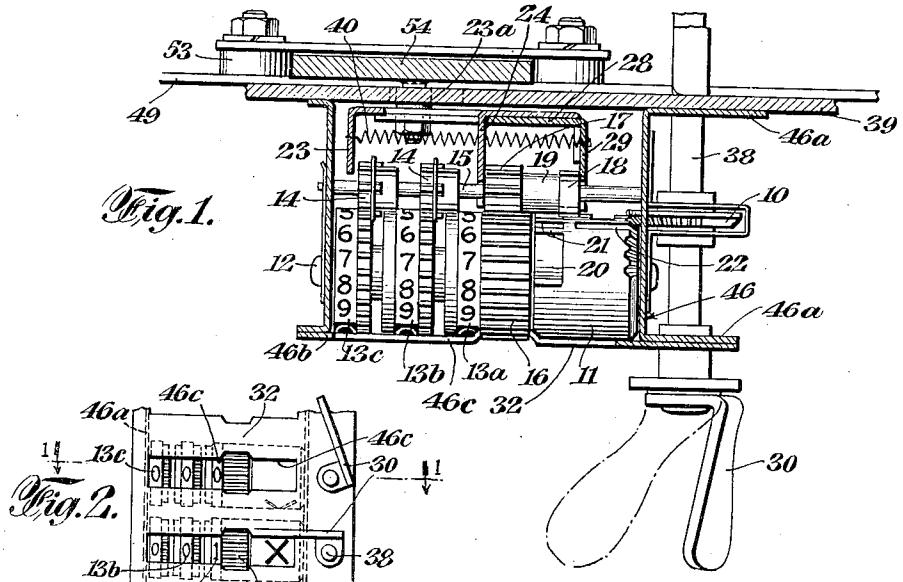


Fig. 1.

Fig. 2.

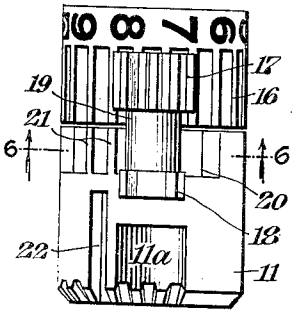


Fig. 3.

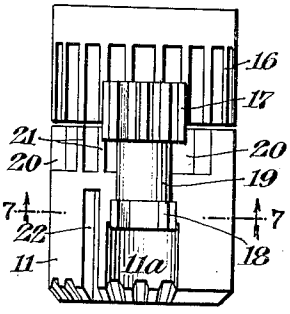


Fig. 4.

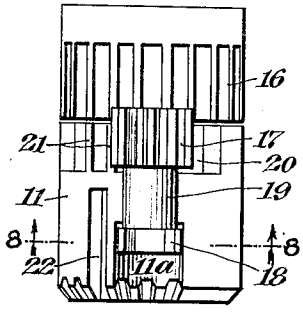


Fig. 5.

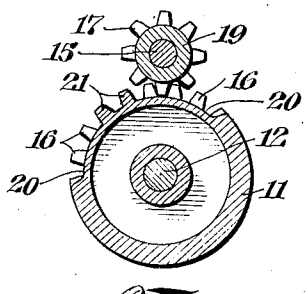


Fig. 6.

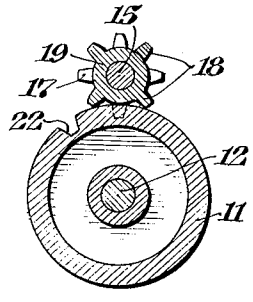


Fig. 7.

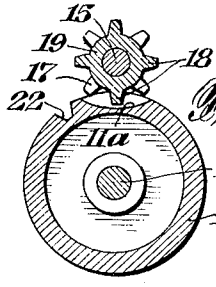


Fig. 8.

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VOTING MACHINE

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9 Claims. (Cl. 235—144)

This invention relates to counters and more especially to counters of the type covered by Ransom F. Shoup United States Patent No. 2,140,336, such counters being designed for use in voting machines of the type disclosed in Shoup et al. United States Patent No. 2,054,102.

In Shoup Patent No. 2,140,336 there is disclosed a counter consisting essentially of a master gear oscillatable over a definite path and a plurality of number wheels in combination with a reciprocable pinion assembly for driving the units wheel by the master gear for vote-registering purposes and for locking the units wheel against operation except through the medium of the master gear. A shield overlies the counter and is provided with a slot through which are visible the digits on the number of wheels. Also, the structure of the counter is such that it can be reset to zero in an easy and expeditious manner merely through the operation of effecting rotation of the units wheel. However, the resetting arrangement shown in said patent is such that during a resetting operation, the pinion assembly is released from the units wheel thereby making it possible to rotate the latter independently of the former and to locate the units wheel with its numbers so oriented with respect to the master gear and shield slot that after one or more operations of the counter, the portion of the units wheel in register with the shield slot will be the space between two digits rather than a digit.

An object of this invention is an improved counter which is of such structure that the units wheel is at all times operatively connected to the pinion assembly so that whenever the master gear lies at one end of its path, the units wheel has one of its digits in full registration with the shield slot.

Other objects, novel features and advantages of the present invention will become apparent from the following specification and accompanying drawing, wherein:

Fig. 1 is a section substantially on the line 1—1 of Fig. 2.

Fig. 2 is a fragmentary front elevation of a counter column of a Shoup type voting machine;

Figs. 3, 4 and 5 are views of the master gear, pinion assembly and units wheel in three different positions;

Fig. 6 is a section on the line 6—6 of Fig. 3;

Fig. 7 is a section on the line 7—7 of Fig. 4, and

Fig. 8 is a section on the line 8—8 of Fig. 5.

In this specification there will be described mechanism common to said Patents No. 2,054,102 and 2,140,336 and the present application with the reference numerals used to designate the mechanism illustrated in the drawing corresponding to those of said two patents so as to make clear the relation of the present improvement to the former structures.

A vertical partition plate 39 supports a plurality of vertical channel members 46, but for the sake of simplicity only one such channel member is illustrated. Each channel member has its open portion facing the partition plate and encloses a column of counters later to be described. Also each channel member is provided with flanges 46*a* through which extend spindles 38 provided with operating handles 30 and in the cross plate 46*b* of the channel member 46 are provided a plurality of horizontal slots 46*c*. On the opposite side of the partition 39 from the channel members 46 is arranged a vertical bar 54 supported as described in Patent No. 2,140,336 for combined vertical reciprocation and horizontal movement and such movement of the bar 54 is effected as described in said patent. The bar 54 acts on rollers 53 attached to horizontal bars 49 to effect horizontal reciprocation of the latter, there being a bar 49 for each horizontal row of spindles.

On each spindle 38 is provided a pinion 10 which meshes with teeth on a master gear 11 supported by a shaft 12 journalled in the sides of the channel member 46 in horizontal alinement with a slot 46*c*. On the shaft 12 are also supported digit wheels 13*a*, 13*b* and 13*c* of which 13*a* is the units wheel and the other two digits wheels are connected therewith in the usual manner through pinions 14 mounted on a shaft 15 which is supported by the sides of the channel member 46. The units wheel 13*a* is provided with twenty teeth 16 and on the shaft 15 is journalled an eight tooth pinion 17 in mesh with the teeth 16. A four-tooth pinion 18 is formed on the end of a stud 19 extending from pinion 17. The teeth of the pinion 18 are so arranged as to engage the master gear 11 as shown in Figs. 1, 3 and 6 to lock the pinion against rotation except as later to be described. The relation of the units wheel and pinion assembly is such that whenever the pinion 18 is in locking relation on the master gear 11, a digit is alined with the slot 46*c*.

The end of the master gear 11 adjacent the units wheel 16 is recessed at 20 to permit movement of the pinion 17 along the shaft 15 and in the recess are provided two transfer teeth 21 adapted to mesh with the pinion 17 when the latter is so arranged as to extend into the recess.

The master gear 11 is provided with a slot 22 extending from the toothed end thereof and having its inner end axially offset from the adjacent end of the recess 20, the slot 22 being in alinement with the groove between the teeth 21 and terminating short of the transfer teeth to form a bridge therebetween. The recess 20 is of insufficient axial width completely to receive the pinion 17 thereby preventing disengagement of it from the teeth 16 and the distance between the opposing faces of the pinions 17 and 18 is slightly less than the distance from the inner or left end of the slot 22 to the face of the master gear adjacent the units wheel. The pinion 17 will be engageable by the teeth 21 whenever a tooth of the pinion 18 is insertable into the slot 22 and the pinion assembly will therefore be positively rotated to cause the tooth of the pinion 18 to move into the slot 22 upon rotation of the master gear 11.

Means are provided for shifting the pinion assembly 17, 18 and 19 along the shaft 15. A vertical channel member 23 is attached by bolt 23a to the bar 49, the bolt 23 passing through a horizontal slot in the partition 39. A lug 24 is struck up from the channel member 23 and a slide 28 having an upturned end 29 is supported by the channel member with the upturned end 29 being arranged exterior of the flange. A spring 40 is associated with the slide 28 and has one end attached to the upturned end 29 with the other attached to the opposite flange of the channel member whereby the slide is normally maintained with the end 29 in contact with the channel flange all as is set forth with more particularity in said Patent No. 2,140,336. The lug 24 and end 29 constitute yokes straddling the pinion assembly and upon movement of the channel member 23 the pinion assembly is correspondingly moved. Each lug 24 and end 29 is recessed to receive the shaft 15 and limit movement of the pinion assembly away from the units wheel.

In the master gear is arranged a recess 11a of sufficient size to receive the teeth of the pinion 18 to permit rotation thereof with consequent unlocking of the pinion 17. The location of the slot 11a is such that when the slot receives a tooth of the pinion 18, the pinion 17 is fully moved into recess 20 and, as previously mentioned, the width of the pinion 17 is such that it cannot be moved out of mesh with the gear 16. The spacing between the slots 22 and 11a equals the width of a tooth 21 and is of sufficient size that with the master gear in unvoted position the pinion 18 may rotate freely.

In Figs. 1, 3 and 6, the pinion assembly is shown in counter-locking position, this being the position of the pinion assembly before a voter enters the voting machine and with the curtains of the machine open. In this position, units wheel 13a is held against rotation by reason of the locking engagement of the teeth of pinion 18 with the periphery of the master gear 11 which prevents rotation of the pinion 18. Therefore, as the pinion 17 is in mesh with the gear 16, rotation of the units wheel 13a is prevented. Upon closure of the curtains the bar 54 is moved to the right (Fig. 1) a predetermined distance carrying with it the bar 49 and the channel member 23, all as described in said Patent No. 2,054,102. Such movement of the channel member 23 causes the yoke member 24 to move the pinion asembly 17, 18, 19 into the position shown in Figs. 4 and 7. In this position, the pinion 17 is still in mesh with the teeth 16 but projects into the path of the teeth 21, and rotation of spindle 38 to the dotted line position of Fig. 1 effects rotation of the master gear 11 to move the slot 22 into position to permit projection thereinto of a tooth of the pinion 18, thereby allowing rotation of the pinion assembly by the transfer teeth 21 to effect one-tenth of a revolution of the units wheel to advance the wheel one digit. During the above-described operation, the master gear 11 is rotated to such an extent that the tooth of pinion 18 which entered the slot 22 is moved out of said slot and it, together with the succeeding tooth of said pinion is again in locking relation to the master gear to prevent rotation of the pinion 17. After the voter has operated the proper spindles to register his vote, he opens the curtains as described in said Patent No. 2,054,102 thereupon causing return of the bar 54 to its original position with the accompanying return of the pinion shifter and pinion assembly to original position, leaving the units wheel in the position to which it had been advanced by operation of the spindle. After the pinion assembly has been returned to original position, the spindle and master gear are returned to the position shown in Fig. 1 by mechanism fully illustrated and described in said Patent No. 2,054,102.

In the event that the voter has left a spindle in a position of incomplete operation, possibility of injury to the counter during the return of the pinion assembly, master gear and spindle to original position is avoided. Under such conditions, a tooth of the pinion 18 will remain sufficiently projected into the slot 22 to prevent full return movement of the pinion assembly thereby preventing disengagement of the pinion 17 from the teeth 21 of the master gear. Thus, when the master gear and spindle are returned to their original position during curtain opening operation of the machine, the teeth 21 will rotate the pinion 17 thereby causing the tooth of pinion 18 to move into the slot 22 without any binding action. At the same time the units wheel is likewise returned to its original position, and injury to the counter is prevented.

When the master gear has been returned to its original position, the tooth of pinion 18 will have completely moved out of the slot 22 thereby permitting full return movement of the pinion assembly to its original position under conditions which cannot cause injury to the counter. The spring 40 permits relative movement of the slide 28 and the channel member 23 so that if a pinion assembly is held against full return movement as above set forth, the channel member may be returned to its original position without injury either to the pinion assembly or the pinion shifter. The spring will yield sufficiently to permit the necessary relative movement of the slide and channel member when the above-described condition arises.

When it is desired to reset the counters to zero, the bar 54 is operated as described in Patent 2,140,336 to move the pinion assembly into the position shown in Figs. 5 and 8 with the pinion 18 in alinement with the recess 11a. The units wheel of the counter is now free to rotate in the reverse direction and may be so rotated merely by wiping the counter face with a brush or other suitable instrument which frictionally engages the units wheel. The front face of the channel member is depressed at 32 so as to permit projection through the channel face of the units wheel teeth. Standard means are provided for

preventing reverse movement of the digit wheels beyond the position in which all three digit wheels have their zeroes in register with the slot 46c, see Patent No. 2,140,336. After the counters have been reset to zero, the pinion assembly is returned to the position shown in Fig. 3.

Should the operator in resetting the counter leave a units wheel in such position that its zero does not fully register with the slot 46c, the pinion 18 will have one of its teeth projecting into the slot 11a (see Fig. 8) thereby preventing return movement of the spindle assembly to the Fig. 3 position. The bar 54 and the bar 49, however, will return to proper poistion due to the stretching of the spring 40. With the counter in this condition, rotation of the master gear by operation of the spindle from unvoted to voting position has no effect on the units wheel until a tooth 21 engages a tooth of the pinion 17 after which the master gear and units wheel rotate in unison. With one or both teeth 21 in mesh with the pinion 17, the units wheel 16 is properly lined up with respect to the master wheel so that after maximum rotation of the master wheel, the number 1 on the units wheel registers with the slot 46c. Rotation of the pinion 17 as just described also causes rotation of the pinion 18 to remove from the recess 11a the tooth projecting thereinto and to bring another tooth of the pinion 18 into the slot 22, thereby permitting return of the pinion assembly to the position shown in Fig. 4 under the influence of the spring 40. Return of the master gear 11 to its initial position leaves the units wheel in position with one of its digits in register with the slot 46c, the particular digit thus in register being dependent upon whether or not the master wheel is returned to original position by the manual operation of the spindle 38 or whether its return is a part of the curtain-opening operation of the machine.

In Fig. 2, two spindles and their associated counters are illustrated. The upper spindle is in unvoted position corresponding to the position shown in full lines in Fig. 1, while the lower spindle is in voted position corresponding to the dotted line position of Fig. 1. In each position of the spindle, a units digit is in register with a slot 46c. Before any actuation of the counter, this digit is zero as indicated in connection with the upper spindle, while after the first movement of the spindle 38 into voting position, the number is 1 as indicated in connection with the lower spindle. Whether or not the resetting operation has placed the units wheel zero directly in register with the slot 46c, the first operation of the spindle 38 will result in the digit 1 of the units wheel being brought into register with the slot 46c and thereafter a units wheel digit will be in register with the slot 46a with the spindle either in its unvoted position or in its voted position.

It is of course understood that various modifications may be made in the structure above described, without in any way departing from the spirit of the invention as defined in the appended claims.

I claim:

1. In a counter, operatively connected number wheels including a units member, an actuating member, an adjustable actuating pinion locatable in three different positions in the first of which it is out of driving relation to said units member and actuating member and in the second and third of which it is in driving relation between said members, and means for locking said pinion on the same one of said members in either of the first and second positions of said pinion, said actuating member having provision for rendering said locking means inoperative in the third position of said pinion.

2. In a counter, operatively connected number wheels including a units wheel, a rotatable actuating member, a gear rotatable with said units number wheel, a reciprocable actuating pinion locatable in three positions in the first of which it is out of driving relation between said actuating member and units wheel and in the second and third of which it is in driving relation therebetween, and means for locking said pinion on said actuating member in either of the first and second positions of said pinion, said actuating member having provision for rendering said locking means inoperative in the third position of said pinion.

3. In a counter, operatively connected number wheels including a units wheel, a rotatable actuating member, a gear rotatable with the units number wheel, an actuating pinion reciprocable between two positions and comprising spaced tooth carrying portions, one of which drives said gear and the other of which is driven by said actuating member and engages the latter to lock said units wheel in one position of said pinion, said actuating member also having grooves therein for receiving teeth on different portions of said pinion with a bridge between said grooves, and a recess for receiving one set of teeth in the remaining position of said pinion.

4. In a counter, operatively connected number wheels including a units wheel, a rotatable actuating member, a gear rotatable with the units number wheel, a reciprocable actuating pinion movable into a first position and a second position and a third position and effective in its second position to drive said gear from said actuating member, said pinion comprising spaced tooth carrying portions and said member having transfer teeth engageable by one portion of said pinion in its second position, a groove longitudinally spaced from said transfer teeth and engageable by the other portion of said pinion in its second position, a bridge between said teeth and groove engageable by said other tooth-carrying portion in the first position of said pinion to prevent rotation of said units wheel, and a recess in said actuating member for receiving said other tooth-carrying portion in the third position of said pinion.

5. In a counter, operatively connected number wheels including a units wheel, an actuating member, a gear rotatable with the units number wheel, a reciprocable actuating pinion movable into a first position and a second position and a third position and effective in its second position to drive said gear from said actuating member, said pinion comprising spaced tooth carrying portions of which one constitutes a driving portion and the other constitutes a locking portion, said actuating member having alined grooves co-operating with both said portions in the second position of said actuating pinion and also having a bridge between the ends of said grooves engageable by said locking portion in the first position of said pinion and having a cut-away section into which said driving portion is reciprocable and a recess for receiving the locking portion of said pinion in the third position of the pinion.

6. A counter comprising a rotatable master wheel having an axial slot in its periphery, operatively connected number wheels including

a units wheel, a gear rotatable with said units wheel, a pair of transfer teeth on said master wheel having the space between them in alinement with said slot, an arcuate recess in said master wheel on one side of one transfer tooth, an adjustable actuating pinion in mesh with said units wheel and axially movable into and out of said recess, said pinion being of greater axial width than the axial width of said arcuate recess, a locking pinion fixed to said actuating pinion in spaced relation thereto, said locking pinion having less teeth than said actuating pinion and being in locking relation with said master wheel both with the actuating pinion completely out of and in one position of partial insertion in said arcuate recess, and a slot in said master wheel arranged to receive said locking pinion with the actuating pinion in a position of further insertion in said arcuate recess.

7. A counter according to claim 6 in which said master wheel slot is closed at its end adjacent said transfer teeth.

8. A counter according to claim 6 in which said master wheel slot is closed adjacent said transfer teeth and the distance between the adjacent faces of said actuating and locking pinions is less than the distance from the closed end of said slot to the end of said transfer teeth adjacent said units wheel.

9. A counter according to claim 5 in which the distance from each edge of said bridge to the end of said transfer teeth adjacent said units wheel at least equals the distance between the adjacent faces of said tooth-carrying portions.

RANSOM F. SHOUP.