Dec. 13, 1938. R. F. SHOUP 2,140,336

COUNTER

Filed Jan. 9, 1937 2 Sheets-Sheet 1

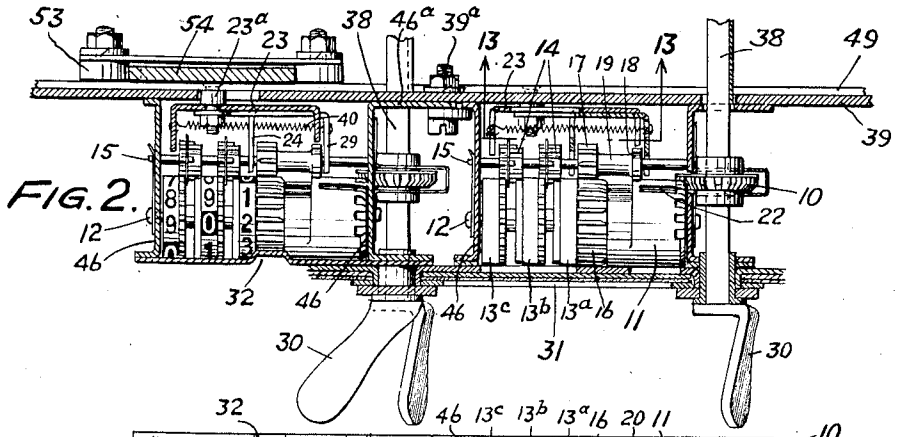


FIG. 2.

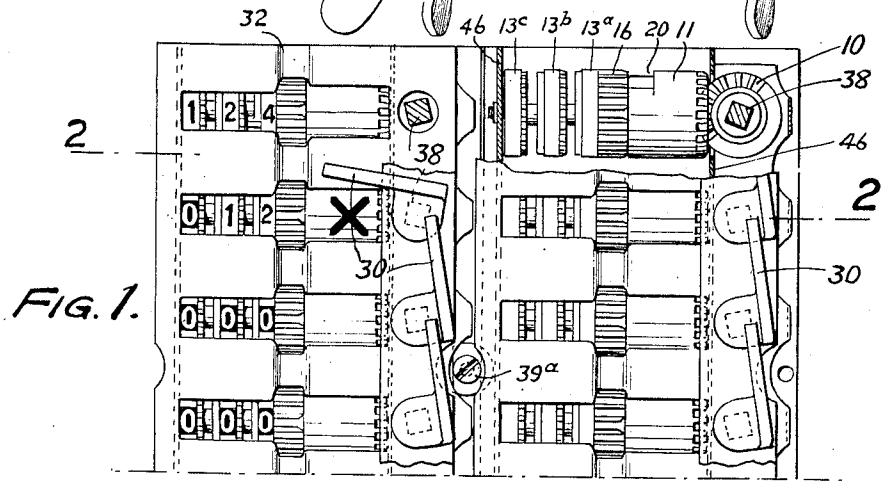


FIG. 1.

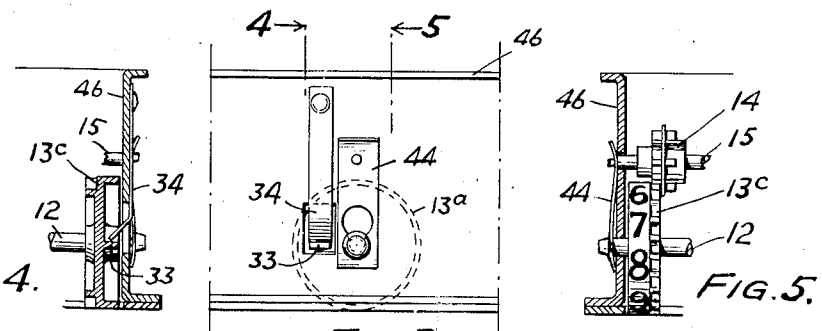


FIG. 4.

FIG. 3.

FIG. 5.

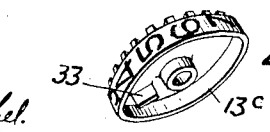


FIG. 6.

WITNESS:

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COUNTER

Filed Jan. 9, 1937 2 Sheets-Sheet 2

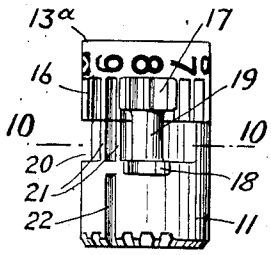


FIG. 7.

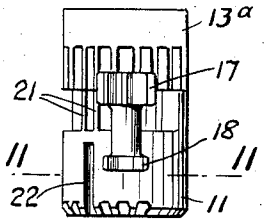


FIG. 8.

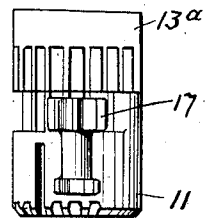


FIG. 9.

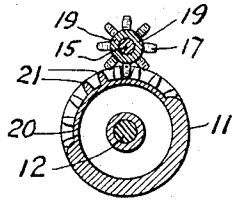


FIG. 10.

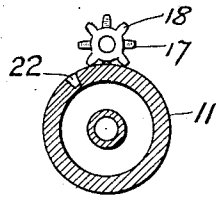


FIG. 11.

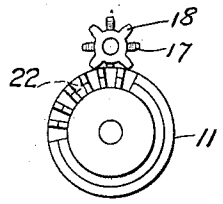


FIG. 12.

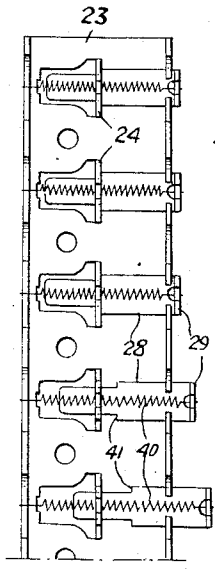


FIG. 13.

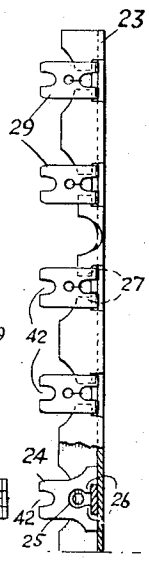


FIG. 14.

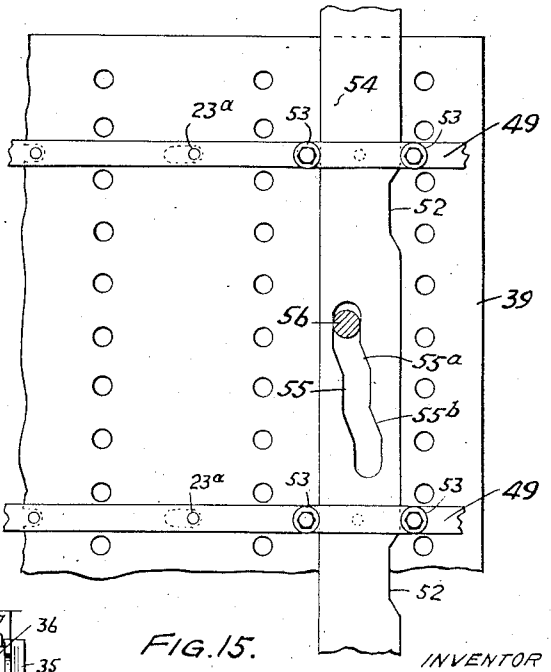


FIG. 15.

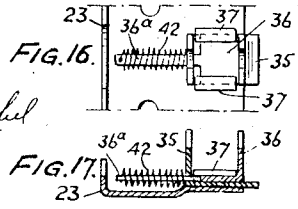


FIG. 16.

FIG. 17.

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Patented Dec. 13, 1938 2,140,336

UNITED STATES PATENT OFFICE

2,140,336

COUNTER

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Application January 9, 1937, Serial No. 119,720

20 Claims. (Cl. 235—117)

This invention relates to counters and more especially to counters for use in voting machines of the type disclosed in Shoup, et al. United States Patent No. 2,054,102. In this patent there is disclosed a voting machine having voting spindles which are normally locked but which are released for voting purposes. Each spindle operates a counter consisting of a master gear and a plurality of indicator wheels. Means are provided for connecting the units wheel to the master gear for vote-registering purposes and for locking the units wheel against operation except when the voting spindles have been released. The structure of the counters of the machine disclosed in said patent is such that if a voter leaves a voting key in a certain position of incomplete operation, the counter may be damaged in the operation of the machine for registering such voter's vote. Furthermore, this structure is such that re-setting of the counters to zero is a tedious and laborious task.

The primary object of this invention is an improved counter which is of such structure that no damage can result to it by reason of faulty operation of the voting key and which can be reset to zero in an easy and expeditious manner.

A further object of this invention is improved mechanism for rendering the counters operative and inoperative according to whether the voting machine is in or out of proper condition for registering votes.

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

Fig. 1 is a front elevation of two counter columns in a voting machine;

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

Fig. 3 is an end elevation of a counter column, the disclosure being limited to a single counter area;

Fig. 4 is a fragmentary section on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary section on the line 5—5 of Fig. 3;

Fig. 6 is a perspective view of a digits wheel of the counter;

Figs. 7, 8 and 9 are views of the master gear pinion and units wheel assembly in different positions;

Fig. 10 is a section on the line 10—10 of Fig. 7;

Fig. 11 is a section on the line 11—11 of Fig. 8;

Fig. 12 is an end view of the assembly;

Fig. 13 is a view substantially on the line 13—13 of Fig. 2;

Fig. 14 is an end elevation of Fig. 13;

Fig. 15 is a rear view of Fig. 2 with certain parts omitted, and Figs. 16 and 17 are views similar to Figs. 13 and 14 of a modification.

In Fig. 2, 39 is the partition plate of the voting machine disclosed in Shoup et al. Patent No. 2,054,102 and 38 are spindles provided with operating handles 30. At the rear of the partition 39 is arranged a bar 54 mounted for combined vertical reciprocation and horizontal movement as described in said patent and acting on rollers 53 attached to bars 49 whereby horizontal reciprocation of the latter is effected. Horizontal movement of the bar 54 is effected through the medium of pins 56 supported by the partition plate 39 and projecting into slots 55 in the bar. The slots have two sections 55a and 55b. Vertical channel members 46 are attached to the front face of the partition 39 by bolts 39a and are provided with flanges 46a through which extend the spindles 38. A ballot assembly 31 is shown between the two columns of spindles 38. In the foregoing description, the reference numerals used correspond to those of said patent so as to make clear the relation of the present improvement to the original machine.

On each spindle 38 is provided a pinion 10 which meshes with teeth on a master gear 11 supported by shaft 12 journalled in the side plates of the channel member 46. On the shaft 12 are also supported digits wheels 13a, 13b, and 13c of which 13a is the units wheel, the other two digits wheels being interconnected therewith in the usual manner through pinions 14 mounted on a shaft 15 which is supported by the side plates of the channel member 46. The units wheel is provided with teeth 16 and on the shaft 15 is journalled a pinion 17 in mesh with the teeth 16. A pinion 18 having half as many teeth as the pinion 17 is formed on the end of a stud 19 extending from the pinion 17. The teeth of the pinion 18 are so arranged as to engage the master gear 11 as shown in Fig. 12 to lock the pinion against rotation. 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 teeth 21 adapted to mesh with the pinion 17 when the latter is moved 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 spaced from the adjacent end of the recess 20, the slot 22 being midway between the teeth 21. The recess 20 is of sufficient width completely to receive the

pinion 17, thereby permitting disengagement of it from the teeth 16 and the distance between the adjacent faces of the pinions 17 and 18 is slightly less than the distance from the inner end of the slot 22 to the face of the master gear adjacent the units wheel. The pinion 17 will be engaged 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 pinion 18 to move into the slot 22 without any binding action. This arrangement precludes the possibility of a tooth of pinion 18 becoming so engaged with the side of the slot 22 as to cause force to be applied tending to bend the shaft 15 out of position.

Means are provided for shifting the pinion assembly 17, 18 and 19 along the shaft 15. A vertical channel member 23 is attached by bolts 23a to the bars 49, the bolts 23a passing through horizontal slots in the partition 39. A series of vertically alined lugs 24 are struck up from the channel member 23 and each lug is cut away to form an aperture 25 provided with shoulders 26. One flange of the channel member 23 is cut out to provide shoulders 27 in horizontal alinement with the shoulders 26. A slide 28 having an upturned end 29 underlies each set of shoulders 26 and 27 with the upturned end 29 being arranged exterior of the flange. A spring 40 is associated with each slide 28 having one end attached to the upturned end 29 and the other to the opposite flange of the channel member whereby the slide is normally maintained with its shoulders 41 in contact with the lug 24. The lugs 24 and ends 29 constitute yokes straddling corresponding pinion assemblies and upon movement of each channel bar 23 all the pinion assemblies of a given column are correspondingly moved. Each lug 24 and end 29 is recessed at 42 to receive the shaft 15 and limit movement of the pinion assembly away from the units wheel.

In Figs. 2 and 7, the pinion assembly is shown in counter-locking position, this being the position of the pinion assembly before a voter enters the voting booth and with the curtains of the booth open. In this position, units wheel 13a is locked against rotation by reason of the engagement of the teeth of pinion 18 with the periphery of the master gear 11 which prevents rotation of the pinion 18. Therefore, the pinion 17 is held against rotation and as it is in mesh with the gear 16, rotation of the units wheel 13a is prevented. Upon closure of the booth curtains as described in said Patent No. 2,054,102, the bar 54 is lifted through a distance equal to section 55a and thereby is moved to the right (Fig. 2) carrying with it the bars 49 and the channel members 23 as described in said patent. Such movement of the channel members 23 causes the yoke members 24 to move the pinion assembly 17, 18, 19 into the position shown in Fig. 8. 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 effects rotation of the corresponding 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 teeth 21 to effect one-tenth of a revolution of the units wheel. During the above-described operation, the master gear 11 is rotated to such an extent that the tooth of pinion 18 which engaged slot 22 is moved out of the slot 22 and it, together with the succeeding tooth is again in locking relation to the master gear preventing 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, thereupon causing return of the bar 54 to its original position with the accompanying return of the pinion shifters and pinions to their original positions shown in Fig. 2, leaving the units wheels in the positions to which they had been advanced by operation of the spindles. After the pinion assemblies have been returned to their original positions, the spindles and master gears are returned to the position shown in Fig. 2 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 assemblies, master gears and spindles to their original positions 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, 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 springs 40 permit relative movement of the slides 28 and the channel members 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 slides and channel members when the above-described condition arises. Each slide 28 is guided in its sliding movement on the channel member 23 through the medium of the slots in the lugs 24 and up-turned flange of the channel member. This manner of mounting the slides 28 on the channel member 23 maintains them in perfect alinement and they cannot shift or tip so as to cause any injury to the mechanism.

When it is desired to reset the counters to zero in preparation for an election, the bar 54 is manually lifted through the entire length of slot 55 and by reason of section 55b is moved further to the right (Fig. 2) than it is moved in the normal operation of the machine for voting. Such movement causes the pinion assembly to be moved into the position shown in Fig. 9 with the pinion 17 being completely received in the recess 20 and therefore being out of mesh with the units wheel 13. The digits wheels of the counters are now free to rotate in 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 teeth. 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. After the counters have been re-set to zero, the pinion assemblies are returned to the position shown in Fig. 2, such return being facilitated by having the

ends of alternate teeth on the pinion 17 slightly tapered and by having corresponding teeth 16 properly chamfered.

The bar 54 is recessed at 52 to insure that the pinion assembly is returned from the position shown in Fig. 8 to the position shown in Fig. 7 by a quick snap. The recess 52 is of such length that when the bar 54 is lifted through its normal upward movement the recess stands fully above the rollers 53. On the return movement of the bar 54, the right-hand roller 53 (Fig. 15) moves into the recess 52 so that the bar 49 and the pinion shifters remain stationary until the bar 54 has nearly reached the end of its downward stroke. Then, the oblique end of the slot 52 engages the roller 53 and snaps the rods 49 and the pinion shifters back to their original positions as shown in Figs. 2 and 7. This snap action tends to prevent any possibility of damage to the machine by reason of incomplete operation of a pinion shifter which would leave the pinion 17 in improper condition for its return to original position.

Each master gear 11 and spindle pinion 10 are provided with only a sufficient number of teeth to effect the required rotation of the master gear. This arrangement makes it impossible to rotate the master gear by a voting spindle through a greater arc than is required for the registration of a single vote, thereby preventing tampering with the counter to cause the same to register improperly. Furthermore, this arrangement of teeth facilitates proper relation of the master gear and spindle pinion in the operation of assembling.

The bolt 39*a* passes through flange 46*a* of one counter channel and has an enlargement which overlies the flange 46*a* of the adjacent counter channel, the first mentioned flange 46*a* being of greater width than the second mentioned flange 46*a*, this arrangement being clearly shown in Fig. 2. However, rotation of the bolt 39*a* through 180° disengages the enlargement from the narrow flange 46*a* so that the channel having such flange may be removed from the partition plate 39 without releasing the counter channel having the wide flange 46*a*.

As shown in Figs. 3 to 6 inclusive, the hundreds wheel 13*c* is provided with a lug 33 which is engaged by the free end of a leaf spring 34 fastened to the side of the channel, said free end extending through an aperture in the side wall of the channel. The leaf spring 34 acts as a stop to prevent reverse rotation of the hundreds wheel and also stops it at zero when being re-set. As the tens and units wheels are interconnected to the hundreds wheel through the pinions 14, the arrangement just described serves to line up all the digits wheels at zero when the counter is reset. Should the counter be actuated beyond 999, the spring 34 will yield to permit the hundreds wheel to advance to zero position.

In the modification shown in Figs. 16 and 17, the pinion shifter consists of two L shaped slides 35 and 36 which are slidably mounted on the bar 23 through the medium of tongues 37 struck up from the member 23 and bent to overlie the horizontal portions of the two slides. The slide 36 has a narrow extension 36*a* which extends through a slot in the slide 35 and a spring 42*a* surrounds the extension 36*a*. The spring 42*a* tends to hold the slides 35 and 36 against the ends of the tongues 37 while permitting movement apart of the slides. Either slide 35 or 36 is movable independently of the other and such arrangement prevents all possibility of injury to the machine from application of pressure to the pinion assembly under any and all circumstances.

A spring clip 44 is provided to lock the shaft 12 against endwise movement to the right and also to lock the shaft 15 against endwise movement to the left. This clip is provided with a bayonet slot which cooperates with a head on the shaft 12 to hold the latter against endwise movement.

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 in one position driving the units member from said actuating member and movable out of driving relation therebetween, and means for locking said pinion on the same one of said members in either position of said pinion.

2. In a counter, operatively connected number wheels including a units wheel, an oscillating actuating member, number wheel actuating mechanism actuated by said actuating member including a driving gear rotatable with said units number wheel and a reciprocable actuating pinion driving said gear from said actuating member during oscillation in one direction and reciprocable out of driving relation therebetween to permit reverse oscillation, and means for locking said pinion on said actuating member in either position of said pinion.

3. In a counter, operatively connected number wheels including a units wheel, an actuating member, and number wheel actuating mechanism actuated by said member including a driving gear rotatable with the units number wheel and a reciprocable actuating pinion driving said gear from said member and comprising spaced tooth carrying portions, one driving said driving gear and the other rotated by said member and engaging the latter to lock said units wheel, said member also having grooves therein engaged by teeth on different portions of said pinion and a bridge between said grooves.

4. In a counter, operatively connected number wheels including a units wheel, an actuating member, and number wheel actuating mechanism actuated by said member including a driving gear rotatable with the units number wheel and a reciprocable actuating pinion driving said gear from said member and reciprocable out of driving relation, said pinion comprising spaced tooth carrying portions, and said member having transfer teeth engageable by one portion of said pinion, a groove longitudinally spaced therefrom and engageable by the other portion of said pinion, and a bridge between said teeth and groove engageable by one of said tooth carrying portions in one position of said pinion.

5. In a counter, operatively connected number wheels including a units wheel, an actuating member, number wheel actuating mechanism actuated by said member including a driving gear rotatable with the units number wheel and a reciprocable actuating pinion driving said gear from said member and reciprocable out of driving relation, said pinion comprising spaced tooth carrying portions of different widths, one constituting a driving portion and the other a locking portion, and said member having grooves cooperating with both portions and also having a bridge between said grooves, said member having

a cut-away portion into which said wider portion is reciprocable.

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 adjustable actuating pinion in mesh with said units wheel gear and movable into and out of the path of said transfer teeth, said master wheel being shaped to provide space at either side of said transfer teeth to receive the teeth of said actuating pinion, and 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 in and out of the path of said transfer teeth.

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 6 in which the space at either side of said transfer teeth is of sufficient width axially of said master wheel to permit disengagement of said actuating pinion from said units wheel gear.

10. A counter according to claim 6 provided with a pinion shifter comprising a member movable axially of said counter, a yoke carried by said first member and having portions overlying opposite ends of said two pinions, one of said yoke portions being slidable relative to said member, and resilient means tending to oppose movement of said portion in one direction.

11. A counter according to claim 6 provided with a pinion shifter comprising a member movable axially of said counter, a yoke carried by said member and having portions overlying opposite ends of said two pinions, one of said yoke members being slidable relative to said member, means for limiting movement of said slidable yoke portion in one direction, and resilient means tending to oppose movement of said slidable yoke portion in the opposite direction.

12. A counter according to claim 6 provided with a pinion shifter comprising a member movable axially of said counter, said member having a struck-up lug, a slide having an upturned flange, a guide slot in said lug for said slide, inter-engaging means on said lug and slide for limiting movement of the latter in one direction, and resilient means tending to oppose movement of the slide in the opposite direction, said lug and flange overlying opposite ends of said two pinions.

13. A counter comprising a master gear, a toothed indicator wheel coaxial therewith, a pinion assembly movable axially of said wheel and gear and being associated therewith for translating rotary movement therebetween, a member movable axially of said counter, a yoke on said member having portions overlying opposite ends of said pinion assembly, one of said portions being slidable relative to said member, and resilient means tending to oppose movement of said slidable portion in one direction.

14. In combination, a shiftable pinion assembly, a shifter therefor comprising a member movable axially of said pinion, a yoke carried by said member and having portions overlying the opposite ends of said pinion assembly, one of said portions being slidable relative to said member, and resilient means tending to oppose movement of said slidable portion in one direction.

15. In combination, a shiftable pinion assembly, a shifter therefor comprising a member movable axially of said pinion, a lug struck up from said member and overlying one end of said pinion assembly, a slide having an upturned flange overlying the other end of said pinion assembly, guide slots in said lug and member for said slide, means on said slide engageable with said lug to limit movement of said slide in one direction, and resilient means tending to oppose movement of said slide in the other direction.

16. In combination, a shiftable pinion assembly, a shifter therefor comprising a member having an upturned edge and an upturned lug, a slide having an upturned flange, guide slots in said lug and upturned edge for said slide, inter-engaging means on said slide and lug for limiting movement of said slide in one direction, and resilient means tending to oppose movement of said slide in the opposite direction, said lug and flange overlying opposite ends of said pinion assembly.

17. In combination, a counter comprising a master gear, a toothed indicator wheel coaxial therewith, a pinion assembly movable axially of said wheel and gear and being associated therewith for translating rotary movement therebetween, a member movable axially of said counter, and means for effecting axial movement of said pinion assembly slowly in one direction and moving said pinion assembly reversely with a snap action.

18. In combination, a counter comprising a master gear, a toothed indicator wheel coaxial therewith, a pinion assembly movable axially of said wheel and gear and being associated therewith for translating rotary movement therebetween, a member movable axially of said counter, and means for effecting axial movement of said pinion assembly comprising a bar, means for moving said bar obliquely to its length, and rollers engageable by opposite sides of said bar, one side of said bar being recessed to receive one of said rollers during a portion of its movement in one direction.

19. In combination, a rotatable pinion assembly, a shifter therefor comprising a member movable axially of said pinion, a yoke carried by said member and having portions overlying the offset ends of said pinion assembly, each of said portions being slidable relative to said member, and resilient means tending to oppose movement of said portions away from each other.

20. In combination, a rotatable pinion assembly, a shifter therefor comprising a member movable axially of said pinion, a pair of slides carried by said member, each slide having an upturned end overlying one end of said pinion assembly and one slide being superposed on the other, a tongue extending from one slide through a slot in the other slide, and resilient means tending to oppose movement of said slides in a direction to increase the distance between said flanges.

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