Feb. 27, 1940. G. J. GRIZEY 2,191,616

REGISTER MECHANISM

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Fig. 1.

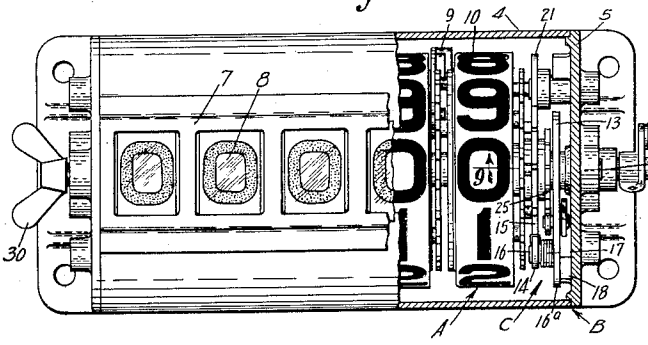


Fig. 3

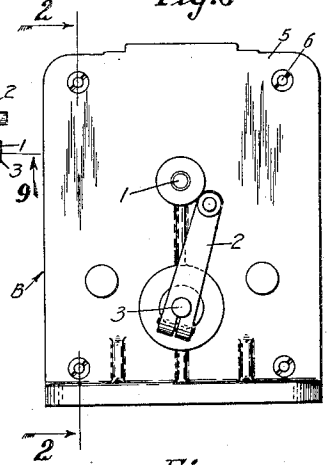


Fig. 2.

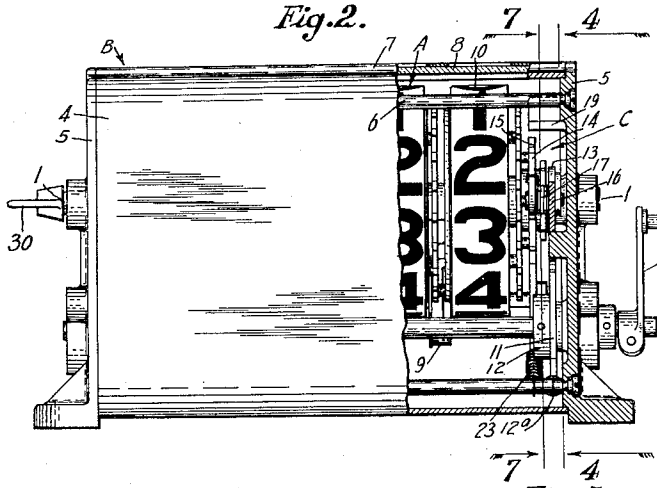


Fig. 10.

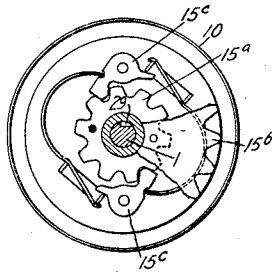


Fig. 4.

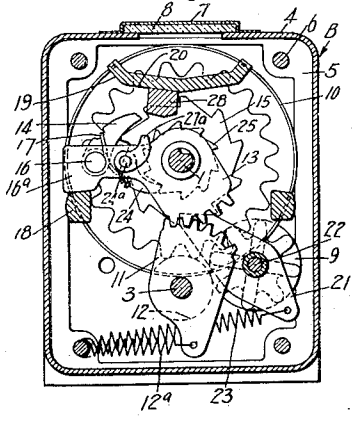


Fig. 5.

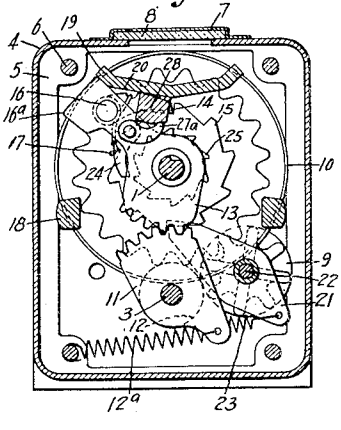
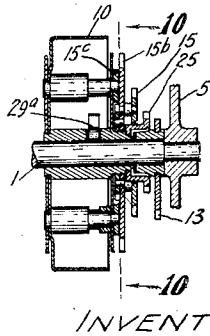


Fig. 9.



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REGISTER MECHANISM

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Fig. 14.

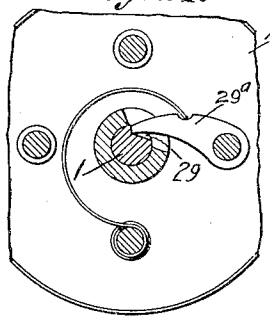



Fig. 6.

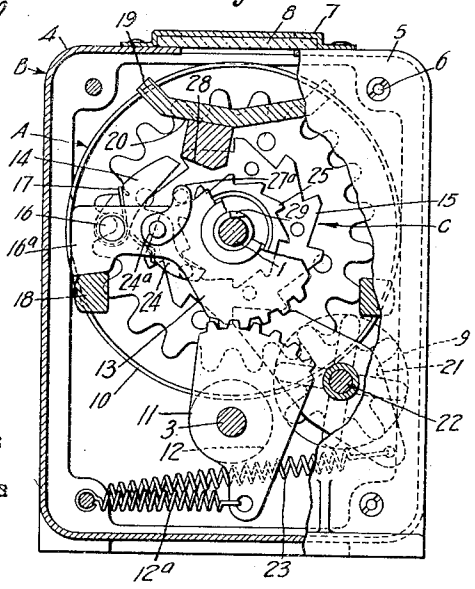



Fig. 13.

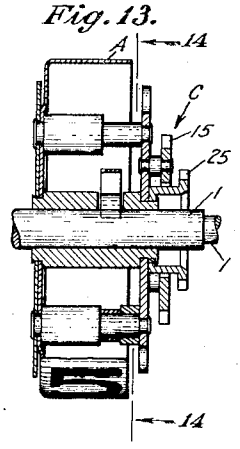



Fig. 12.

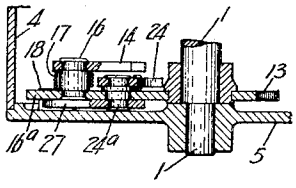



Fig. 8.

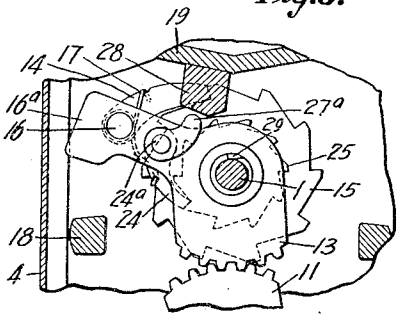



Fig. 7.

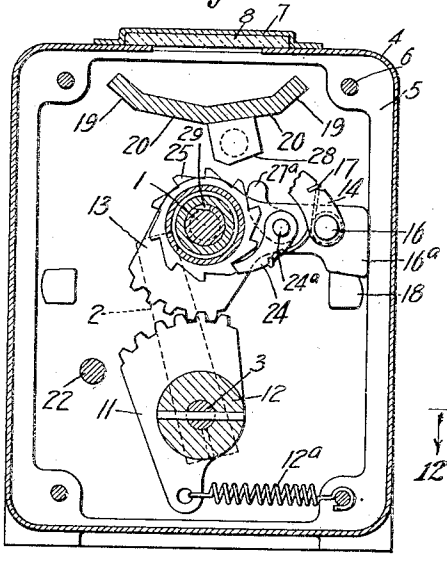
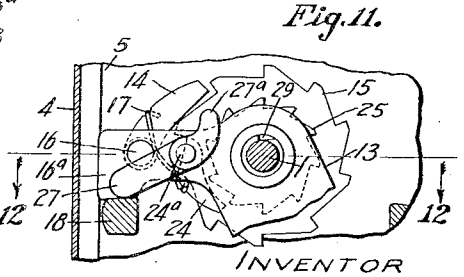



Fig. 11.




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# UNITED STATES PATENT OFFICE

2,191,616

## REGISTER MECHANISM

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Application November 10, 1937, Serial No. 173,834

11 Claims. (Cl. 235—131)

My invention relates to register mechanisms.

It has among its objects to provide an improved register mechanism, and more particularly to provide improved mechanism for preventing overthrowing of the register during operation. A further object of my invention is to provide such an improved mechanism having means for locking the lowest order, or driving, wheel of the register against rotation in either direction except by a registering operation of the register actuating drive. A still further object is to provide an improved ratchet actuating mechanism for registers having improved means to prevent movement of the lowest order register wheel ahead of the ratchet mechanism. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawings, I have shown for purposes of illustration two embodiments which my invention may assume in practice.

In these drawings—

Figure 1 is a plan view of a register, the casing being broken away and partly in section to show my improved mechanism;

Fig. 2 is an elevational view of the register, the casing being broken away and showing a section substantially on the line 2—2 of Fig. 3;

Fig. 3 is an end view of the register;

Fig. 4 is a sectional view on the line 4—4 of Fig. 2, showing the register actuating mechanism in its normal inoperative position;

Fig. 5 is a like sectional view showing the mechanism at the end of a register actuating stroke;

Fig. 6 is a view similar to Fig. 4 but on an enlarged scale, with portions broken away to facilitate illustration;

Fig. 7 is an enlarged sectional view on the line 7—7 of Fig. 2;

Fig. 8 is an enlarged detail view of the register actuating mechanism showing the position of the parts just prior to the completion of the registering stroke and the release of the locking pawl;

Fig. 9 is a section on line 9—9 of Fig. 1;

Fig. 10 is a section on line 10—10 of Fig. 9;

Fig. 11 is an enlarged detail view, showing a modified form of controlling arm for the locking pawl;

Fig. 12 is a section on line 12—12 of Fig. 11;

Fig. 13 is a section through the lowest order counting wheel of Fig. 11, and

Fig. 14 is a section on line 14—14 of Fig. 13.

In the construction illustrated in Figures 1–10, I have shown a register having counting wheels, generally indicated at A, which are assembled within a frame and casing B, the counting wheels A being journalled on a shaft 1 mounted in the end walls of the casing B. The counting wheels A are rotated by improved ratchet actuating mechanism, located adjacent one end of the casing and indicated generally at C, which is operatively connected with an external actuating arm 2 through an operating shaft 3. Herein, the casing is of a usual construction comprising a rectangular body 4, end members 5, and tie rods 6, holding the end members tightly against the body 4; the casing also being provided with a usual raised guard 7 having spaced apertures over each of the wheels, and a glass 8 between the guard and the casing permitting visibility of the numbers on the counting wheels which are beneath the apertures.

Herein, the counting wheels A are of a usual denominational order type, being independently rotatable on the shaft 1 and operatively connected by usual tens-transfer mechanism including the transfer pinions 9. The ratchet actuating mechanism C for actuating the counting wheel 10 of lowest order is controlled by a toothed sector 11 which is fastened to a collar 12, while both sector and collar are fixed to the shaft 3 and moved together with the same when the actuating arm 2 is operated. In order that the sector, shaft and arm 2 shall return to initial position after a registering operation, improved stop means, hereinafter described, are provided and a coil spring 12a is connected between the lower end of the sector 11 and an adjacent tie rod 6 so as constantly to bias the sector in a clockwise direction as viewed in Fig. 4. Each operation of the toothed sector 11 by the actuating arm 2 advances the lowest order wheel 10 one-tenth of a revolution through engagement of the toothed sector with a cooperating toothed member, or arm, 13 which is journalled at one end on shaft 1. The member 13 has mounted thereon, adjacent its free end, a driving pawl 14 adapted to actuate a 10-tooth operating ratchet wheel 15 operatively connected to the lowest order wheel 10, herein by means of a usual clutch comprising the ratchet 15a, carried on a usual 20-tooth gear 15b, and usual cooperating spring pressed pawls 15c carried by the wheel 10. The driving pawl 14 is pivoted on a stud 16 extending laterally from a projecting arm 16a on the toothed member 13, and is acted upon by a spring 17 coiled about the stud 16 and having a bent end engaging a notch in the top of the pawl 14 for pressing the pawl constantly into engagement with the ratchet wheel 15. The arm 16a also cooperates with a pair of spaced stops 18 and 19

formed on the adjacent casing end wall 5, the latter of which extends laterally over the actuating mechanism C and overlies the ratchet wheel 15 and pawl 14. The position of the stops 18 and 19 is such that a reverse oscillation of the external actuating arm 2 to effect movement of the arm 16a into engagement with stop 19 and back against stop 18, will cause the ratchet wheel 15 to be advanced one tooth and the counting wheel 10 to be advanced one-tenth of a revolution. The stop 19 has an inclined lower face 20, against which the top of pawl 14 engages simultaneously with the engagement of arm 16a with stop 19, as shown in Fig. 5, thus locking the ratchet wheel 15 against rotation in either direction and preventing overthrow of the counting wheel 10 at the end of a counting movement. A non-reverse pawl 21 is also pivoted on a shaft 22, which carries the transfer pinions 9 and this pawl acts, under tension of a spring 23, to prevent the ratchet 15 from rotating reversely during the return of the pawl 14 to initial position.

In my improved mechanism, I also employ a locking pawl 24 fixed to a shaft 24a journalled in the arm 16a intermediate its ends, and a cooperating ratchet wheel 25 having its teeth disposed oppositely to those of the ratchet 15 and rotatable with said ratchet wheel and rotatable during counting, with the hub of the lowest order wheel 10; this mechanism functioning to prevent advance of that wheel ahead of the actuating mechanism by inertia, during a registering operation, either by a sharp, incomplete operation of the actuating arm 2, or as a result of a blow on arm 2, for example, when the stop arm 16a is intermediate the stops 18 and 19. As shown, the ratchet wheel 25, although smaller, has the same number of teeth as the ratchet wheel 15. The coil spring 17 which has one end engaging the actuating pawl 14 also has its other end hooked over the locking pawl 24, and thus serves to hold both pawls in engagement with their cooperative ratchet wheels. Further, the shaft 24a carries an arm 27a on the opposite side of arm 16a from locking pawl 24 (Fig. 8), and this arm 27a engages a cam 28, carried by casing wall 5, just prior to the end of a registering operation, rocking the locking pawl 24 out of engagement with ratchet wheel 25 and holding it out of contact therewith sufficiently long to permit the pawl 24 to pass over the adjacent tooth of the ratchet 25, out of contact therewith, during the first part of the return movement of the actuating mechanism.

In the operation of this form of my invention, the lowest order counting wheel 10 of the register is rotated one-tenth of a revolution each time that the actuating arm 2 is moved to the left from its normal position shown in Fig. 3. During this registering stroke of arm 2, the toothed member 13 is moved clockwise into the position shown in Fig. 5 in which its arms 16a engage the stop 19. During this movement, the driving pawl 14 has engaged and rotated the ratchet wheel 15 through the space of one tooth or one-tenth of a revolution. Thus, due to the pawl 24 and ratchet 25, the lowest order counting wheel is effectively locked to the actuating arm 2 and moves in step therewith, from the very beginning of the registering movement of the counting wheel, and cannot, by its inertia or otherwise, travel ahead of the ratchet actuating mechanism. The top of driving pawl 14 has also at the end of the stroke, engaged the abutment surface 20 (Fig. 5) and acts as a wedge between this surface and the ratchet wheel 15, thus securely locking the lowest order wheel against rotation in either direction and particularly preventing over-travel of the same in a counting direction. Moreover, note that after thus locking the lowest order wheel and just prior to the engagement of arm 16a with stop 19, the control arm 27a engages cam 28 in such manner that, in the final movement of the mechanism, the locking pawl 24 is rocked out of locking engagement with its ratchet wheel 25, thus permitting the actuating mechanism to return to its initial position.

As the actuating arm 2 is returned to its initial position following the above described registering stroke, the locking pawl 24 is held out of locking engagement with its cooperating ratchet wheel 25 by the engagement of the control arm 27a with cam 28 long enough to permit the locking pawl 24 to pass over the tooth with which it was in locking engagement during the previous registering stroke. This will be evident from an inspection of Fig. 5, showing the locking pawl before the return movement of the actuating arm has begun. Here it will be noted that during this return movement of the actuating mechanism, the counting wheel 10 is locked against advance with respect to its actuating mechanism, and further noted that, if by any fraudulent means, it has been already advanced, it will be returned by the locking pawl 24 to its correct position.

In the modified construction shown in Figs. 11 to 14, which is adapted to use with a lowest order wheel without a clutch connection therein corresponding to that shown in Fig. 10, the left hand end of the arm 27a is provided with an extension 27 which engages the stop 18 just prior to engagement of arm 16a with this stop, thus rocking the locking pawl 24 out of engagement with its cooperating ratchet wheel 25. This arrangement may be required in the instance where the usual resetting feature is desired, without employing the clutch connection shown in Fig. 10, the use of which obviates the need of momentarily unlocking the locking pawl 24. In the arrangement without the clutch connection, the extension 27 engages stop 18 and, in doing so the locking pawl 24 is released from its ratchet 25, which release is maintained only while arm 16a is in initial position. Thus, at initial position of the actuating mechanism, the locking pawl, being released from its ratchet 25, permits the said ratchet to be rotated in a forward or counting direction when actuated by the resetting device to set the counting wheels to zero. It is to be noted, however, that locking pawl 24 swings into engagement with its ratchet 25 at the instant arm 16a is actuated from its initial position and the arm 16a and associated actuating mechanism are thus locked to ratchets 15, 25 to prevent any rotation of the ratchets relatively to the actuating mechanism during the actuating and return strokes and thereby prevent fraudulent manipulation of the counter.

In both forms of my invention, it will be observed that the shaft 1 is provided with a usual resetting groove or slot 29 adapted to cooperate with usual pawls 29a carried on the number wheels, as shown in Figs. 9 and 14, all in such manner that resetting may be effected in a usual manner by rotating a wing nut 30 to rotate shaft 1.

As a result of my invention, it will be evident that I have provided an improved register of the ratchet actuated type, wherein the lowest order counting wheel of the register is positively locked against over-travel at the end of the registering stroke, and in which it is also locked to the actuating mechanism during the registering stroke, in such manner as to prevent fraudulent advance of the count by the manipulation of the actuating mechanism, or by a blow on the same. Further, it will be noted that, as a result of my improved construction, in the normal position of the parts, the driving pawl is out of engagement with the cooperating tooth of its driving ratchet wheel, so that a blow on the actuating mechanism cannot be transmitted to the counting wheel. Also in the modified form, in which the locking pawl **24** is initially out of engagement, before pawl **14** engages its cooperating tooth, locking engagement takes place between the pawl **24** of the actuating mechanism and the ratchet wheel **25** of the counter wheel. Further, it will be noted that in the return movement of the actuating arm, following a registering stroke, the locking means is likewise operative to prevent fraudulent advance of the counter wheel to register a count.

While I have in this application specifically described two embodiments which my invention may assume in practice, it will be understood that the same are shown for illustrative purposes only and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a register, a rotatable counting member, ratchet actuating mechanism including a driving ratchet wheel operatively connected to said member and a pivoted actuating member having a driving pawl adapted to cooperate with said ratchet wheel, stops between which said actuating member is movable, and controlling mechanism for locking said actuating member and driving ratchet wheel for movement together during a part of the registering stroke including a locking ratchet rotatable with said driving ratchet and having oppositely disposed ratchet teeth and a cooperating locking pawl pivotally mounted on said pivoted actuating member.

2. In a register, a rotatable counting member, ratchet actuating mechanism including a driving ratchet wheel operatively connected to said member and a pivoted actuating member having a driving pawl adapted to cooperate with said ratchet wheel, stops between which said actuating member is movable, and controlling mechanism for locking said actuating member and driving ratchel wheel for movement together during a part of the registering stroke including a locking ratchet rotatable with said driving ratchet and having oppositely disposed ratchet teeth and a cooperating locking pawl pivotally mounted on said pivoted actuating member, said locking pawl having a controlling arm movable therewith and engageable with one of said stops near the end of the registering stroke of said actuating member for moving said locking pawl out of locking engagement with its cooperating locking ratchet wheel.

3. In a register, a rotatable counting member having two ratchet wheels with oppositely directed teeth rotatable therewith, and actuating means for said member including a pivoted actuating member having two oppositely disposed pawls pivotally mounted thereon in position to cooperate respectively with said ratchet wheels upon movement of said actuating member.

4. In a register, a rotatable counting member having two ratchet wheels with oppositely directed teeth rotatable therewith, actuating means for said member having two oppositely disposed pawls pivotally mounted thereon in position to cooperate respectively with said ratchet wheels upon movement of said actuating member, and control means for effecting disengagement of one of said pawls from its cooperating ratchet wheel near the end of the registering movement of said actuating member.

5. In a register, a rotatable counting member having two ratchet wheels with oppositely directed teeth rotatable therewith, actuating means for said member including a pivoted actuating member having two oppositely disposed pawls pivotally mounted thereon in position to cooperate respectively with said ratchet wheels upon movement of said actuating member, spaced stop means for limiting the movement of said actuating member, and control means including a controlling arm movable with one of said pawls and engageable with said spaced stops for effecting disengagement of said pawl from its cooperating ratchet wheel as said actuating arm approaches the opposite ends of its path of movement.

6. In a register, a rotatable counting member having two ratchet wheels with oppositely directed teeth rotatable therewith, actuating means for said member including a pivoted actuating member having two oppositely directed pawls pivotally mounted thereon in position to cooperate respectively with said ratchet wheels upon movement of said actuating member, a stop cooperating with said actuating member at the end of registering movement thereof also having means simultaneously cooperating with one of said pawls for preventing rotation of said counting member, and means carried by the other of said pawls and cooperating with a fixed portion of said counter for camming said latter pawl out of engagement with its ratchet wheel during the completion of the registering stroke and for maintaining it out of engagement therewith during the initial return movement of said actuating member and while said counting member remains locked against rotation by said first mentioned pawl.

7. In a register, a rotatable counting member having an actuating ratchet wheel rotatable therewith, actuating mechanism for said member including a pivoted member having an actuating pawl adapted to cooperate with said ratchet wheel, means for interlocking said counting member and said actuating member in all positions of the latter including a locking ratchet wheel on said counting member having teeth oppositely directed with respect to the teeth of said actuating ratchet wheel and a locking pawl member pivotally mounted on said pivoted member and constantly biased into engagement with said locking ratchet wheel, and means for camming said locking pawl member over a tooth of its cooperating ratchet wheel near the end of each registering stroke of said actuating member for permitting the return of said actuating mechanism independently of said counting member.

8. In a register, a rotatable counting member having an actuating ratchet wheel rotatable

therewith, actuating mechanism therefor including a pivoted actuating member having a pawl adapted to cooperate with said ratchet wheel, and means for preventing fraudulent advance of said counting member without a corresponding movement of said actuating mechanism including a locking ratchet wheel rotatable with said counting member having its teeth oppositely directed with respect to said actuating ratchet wheel and a locking pawl pivotally mounted on said actuating member and engaging said locking wheel in the normal position of said actuating mechanism prior to a registering operation of the latter.

9. In a register, a rotatable counting member, ratchet actuating mechanism therefor including an actuating ratchet and pawl, means for preventing an overthrow rotation of said member in advance of said ratchet actuating means and including a second ratchet and pawl oppositely disposed with reference to said actuating ratchet and pawl, said second pawl being engaged with and movable with said second ratchet during the registering stroke of said ratchet actuating mechanism, and means for disengaging said second pawl from said second ratchet just before the end of the registering stroke.

10. In a register, a rotatable counting member, ratchet actuating mechanism therefor including an actuating ratchet and pawl, means for preventing an overthrow rotation of said member in advance of said ratchet actuating means and including a second ratchet and pawl oppositely disposed with reference to said actuating ratchet and pawl, said second pawl being engaged with and movable with said second ratchet during the registering stroke of said ratchet actuating mechanism, means for disengaging said second pawl from said second ratchet just before the end of the registering stroke, and means for positively holding said first mentioned pawl in engagement with said actuating ratchet during the completion of a registering stroke.

11. In a register, a rotatable counting member, ratchet actuating mechanism including a ratchet, an oscillating member, and an actuating pawl pivoted to said oscillating member and cooperating with said ratchet; a second ratchet and pawl oppositely disposed with respect to said actuating ratchet, said second pawl being pivoted to said oscillating member, means for positively holding said first pawl in engagement with the actuating ratchet during the completion of the registering stroke of said oscillating member, and means for disengaging said second pawl from its ratchet as said oscillating member approaches the end of its operative stroke.

GEORGE J. GRIZEY.