May 11, 1937. J. Q. FINFROCK ET AL 2,079,704

LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

Filed June 13, 1934 11 Sheets-Sheet 1

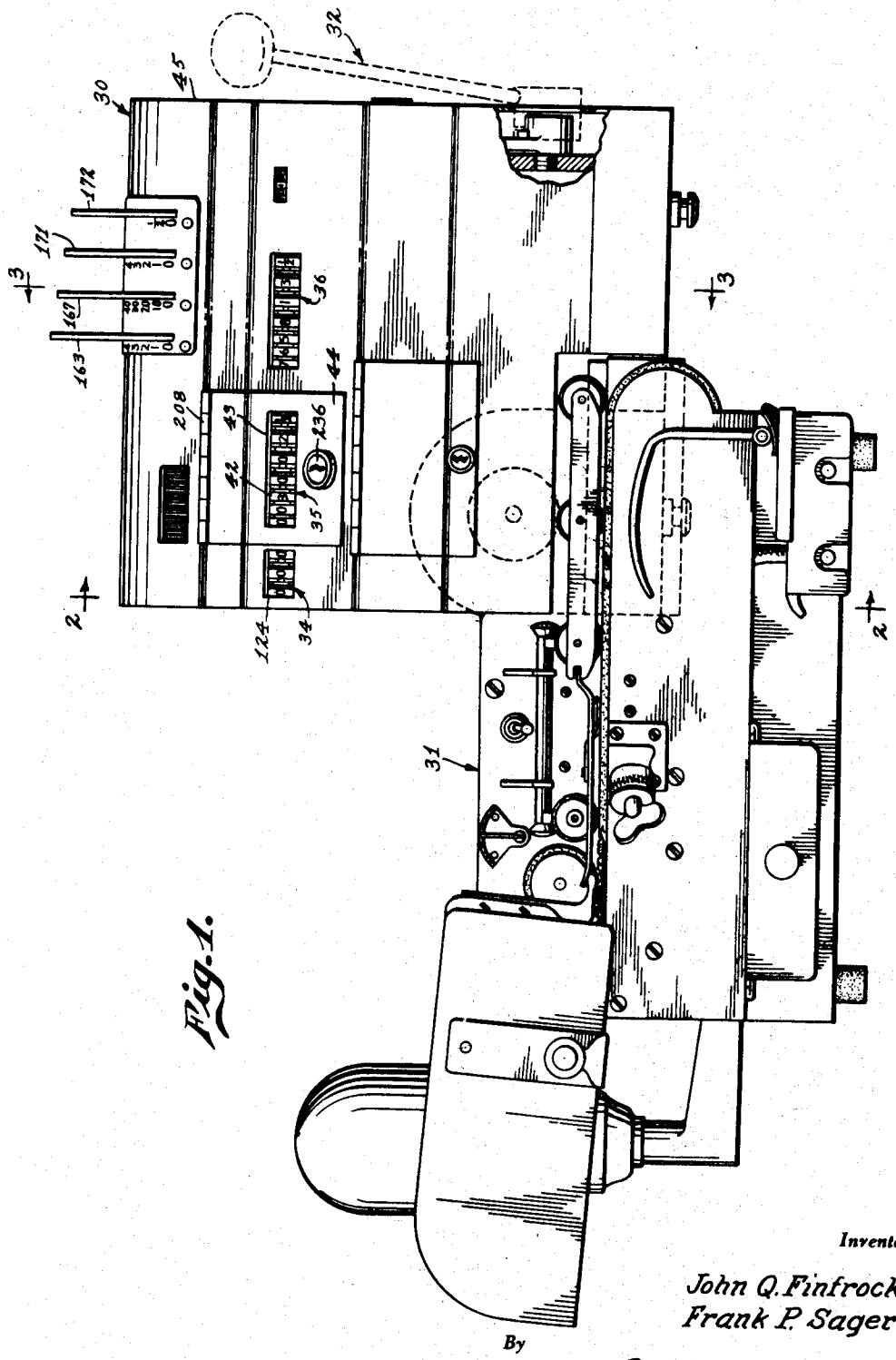


Fig. 1.

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By

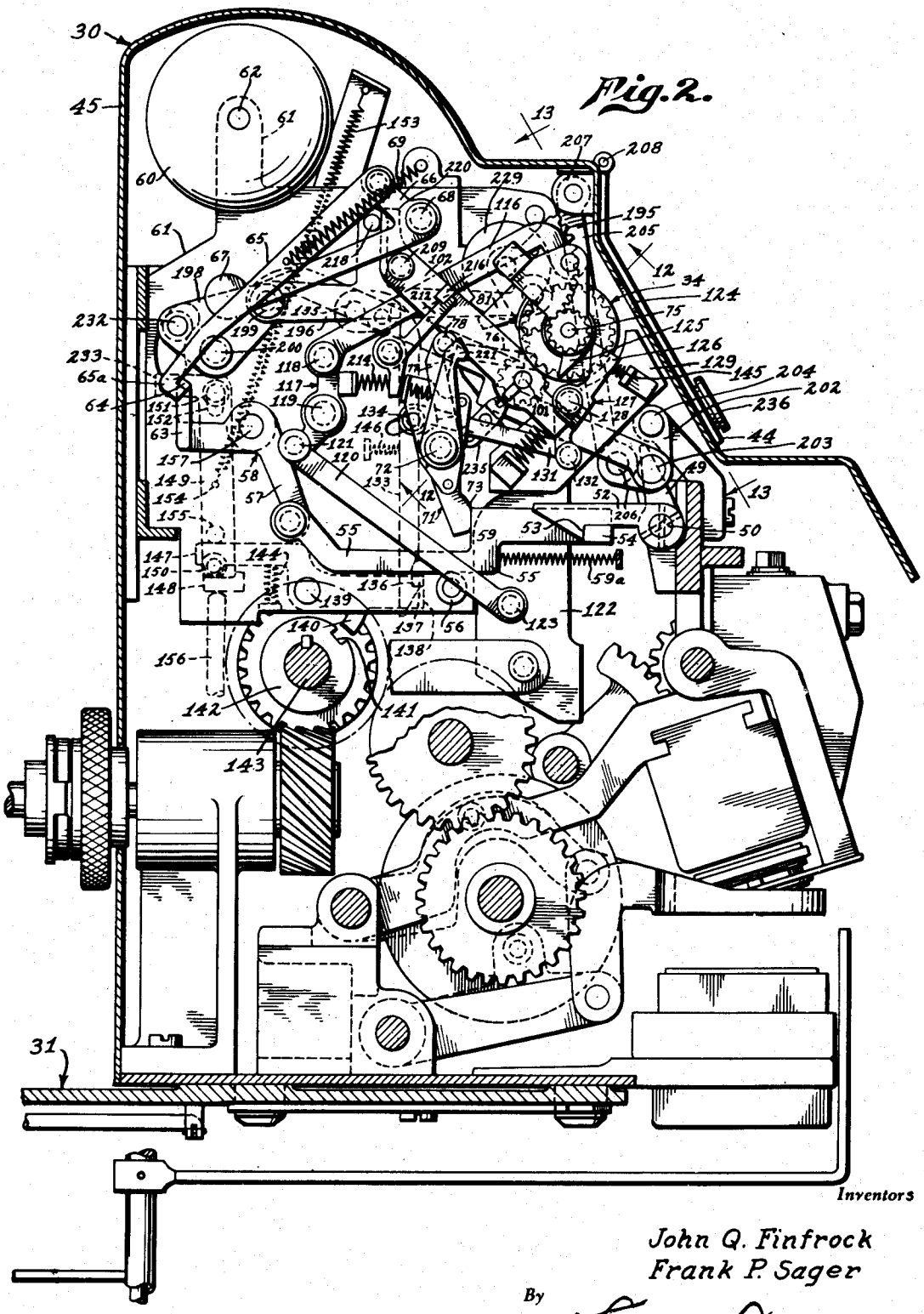
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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

Filed June 13, 1934 11 Sheets-Sheet 2

Fig. 2.



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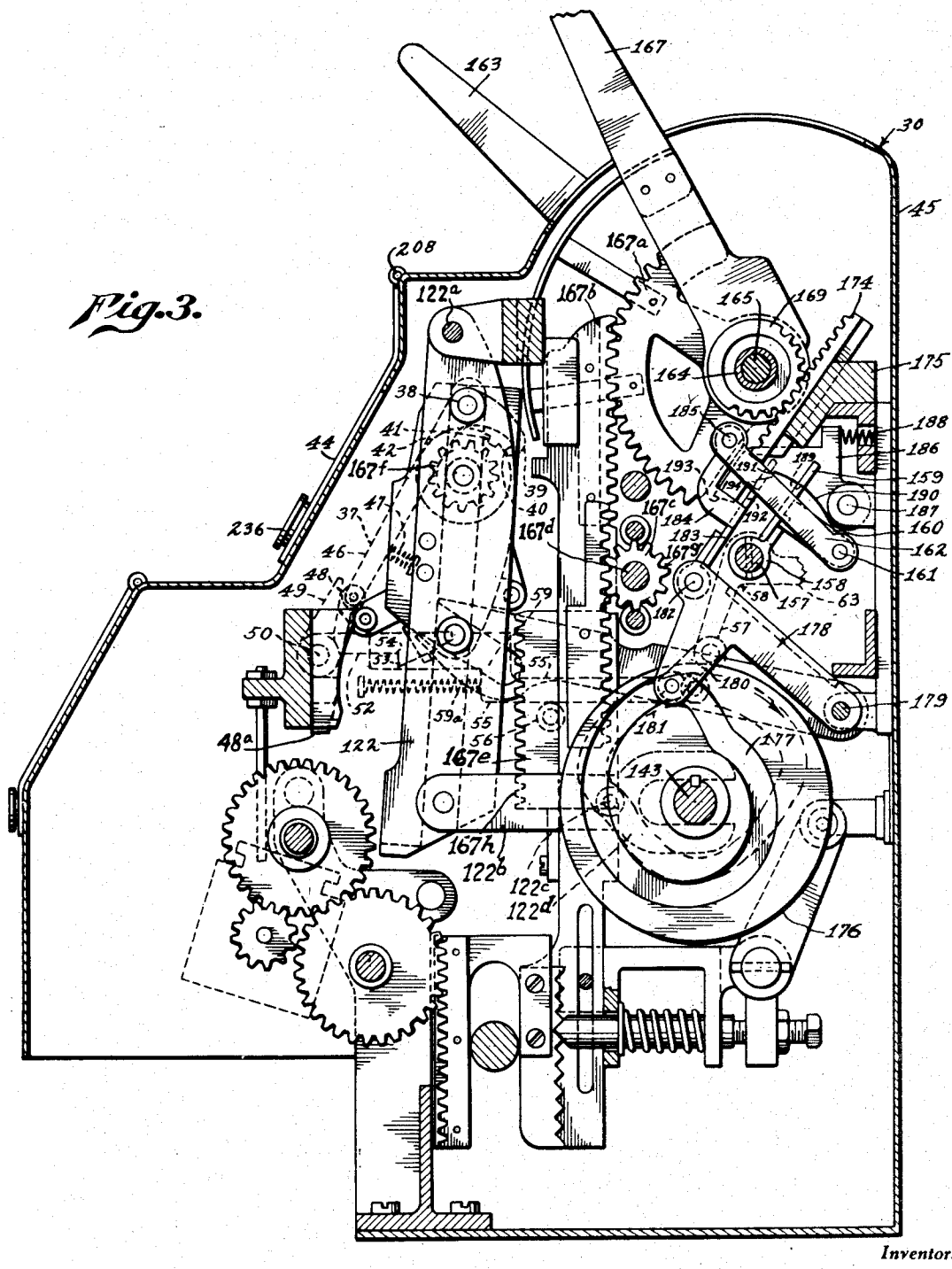
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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

Filed June 13, 1934 11 Sheets-Sheet 3

Fig. 3.



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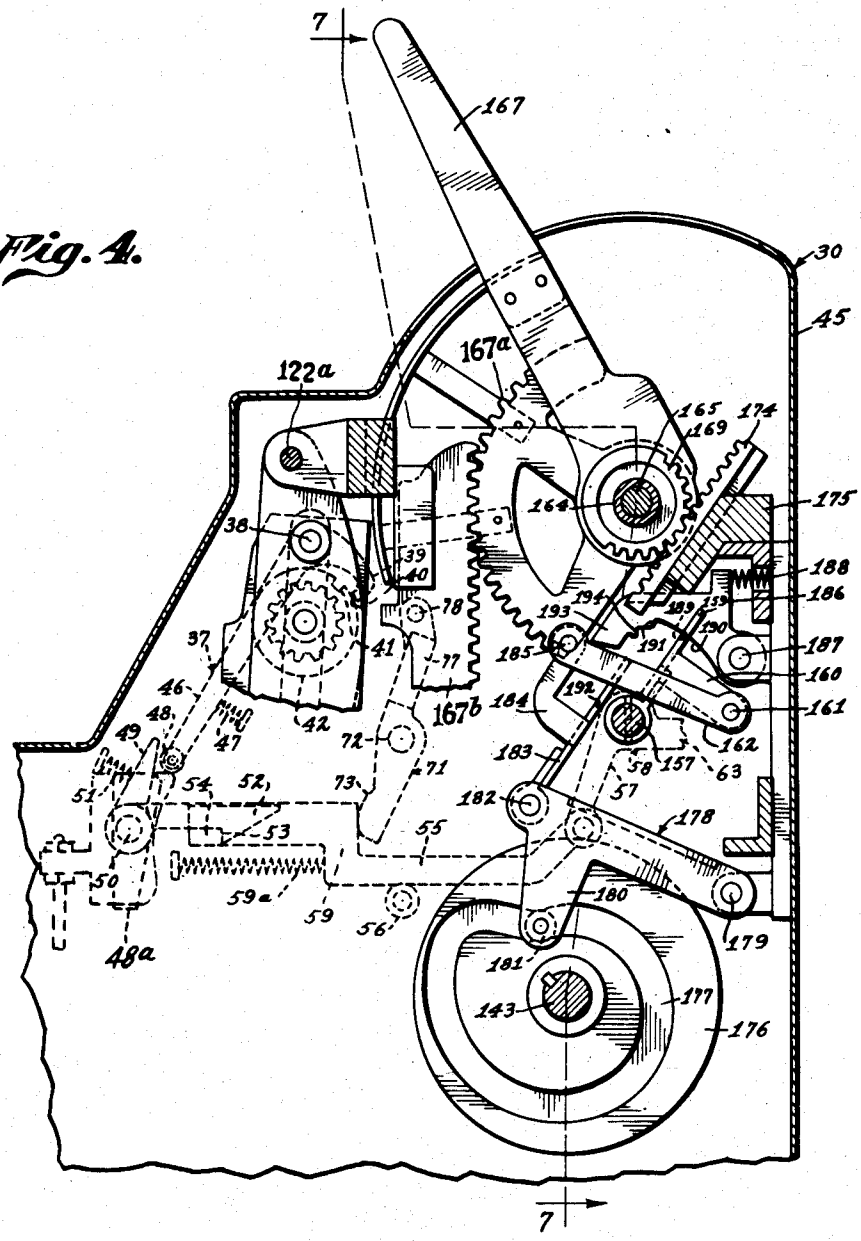
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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

Filed June 13, 1934 11 Sheets-Sheet 4

Fig. 4.



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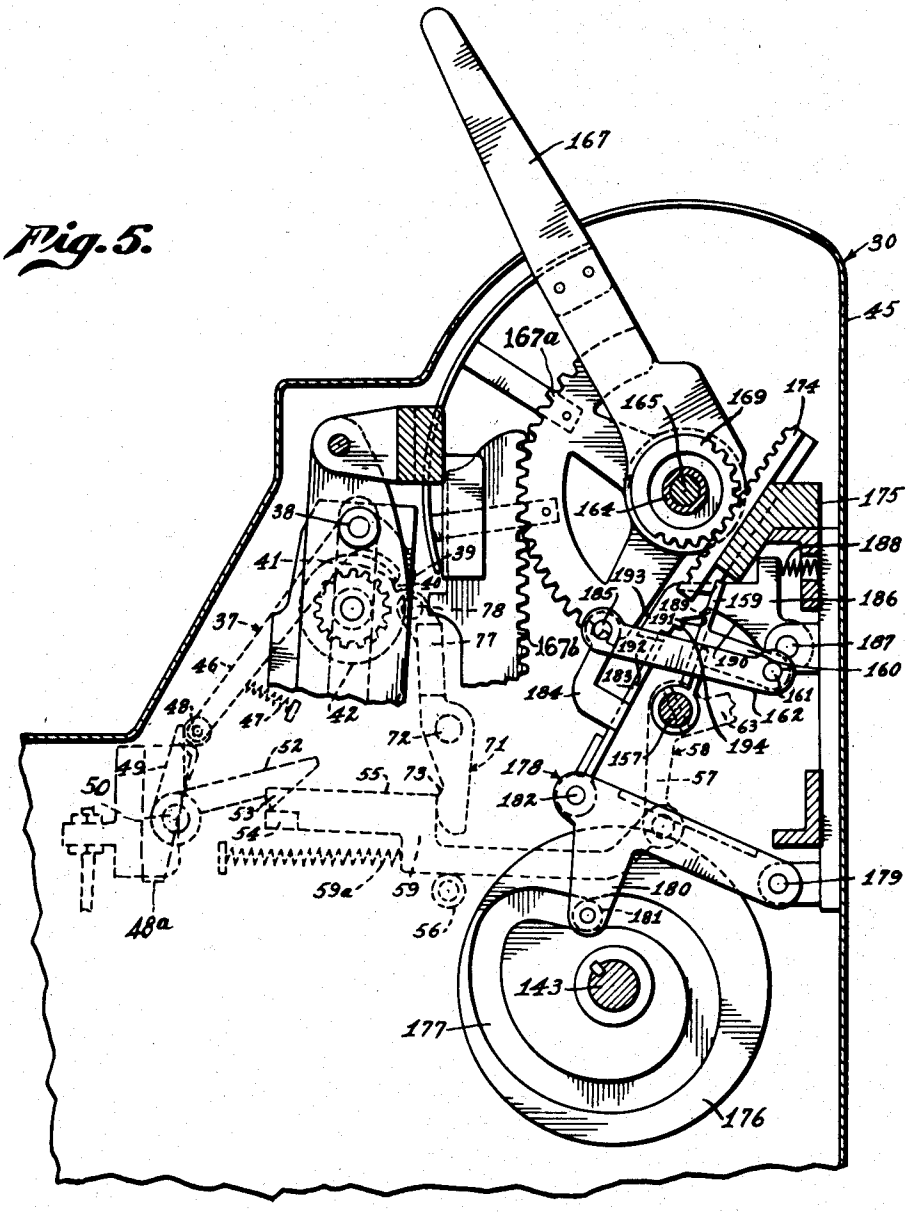
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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

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Fig. 5.



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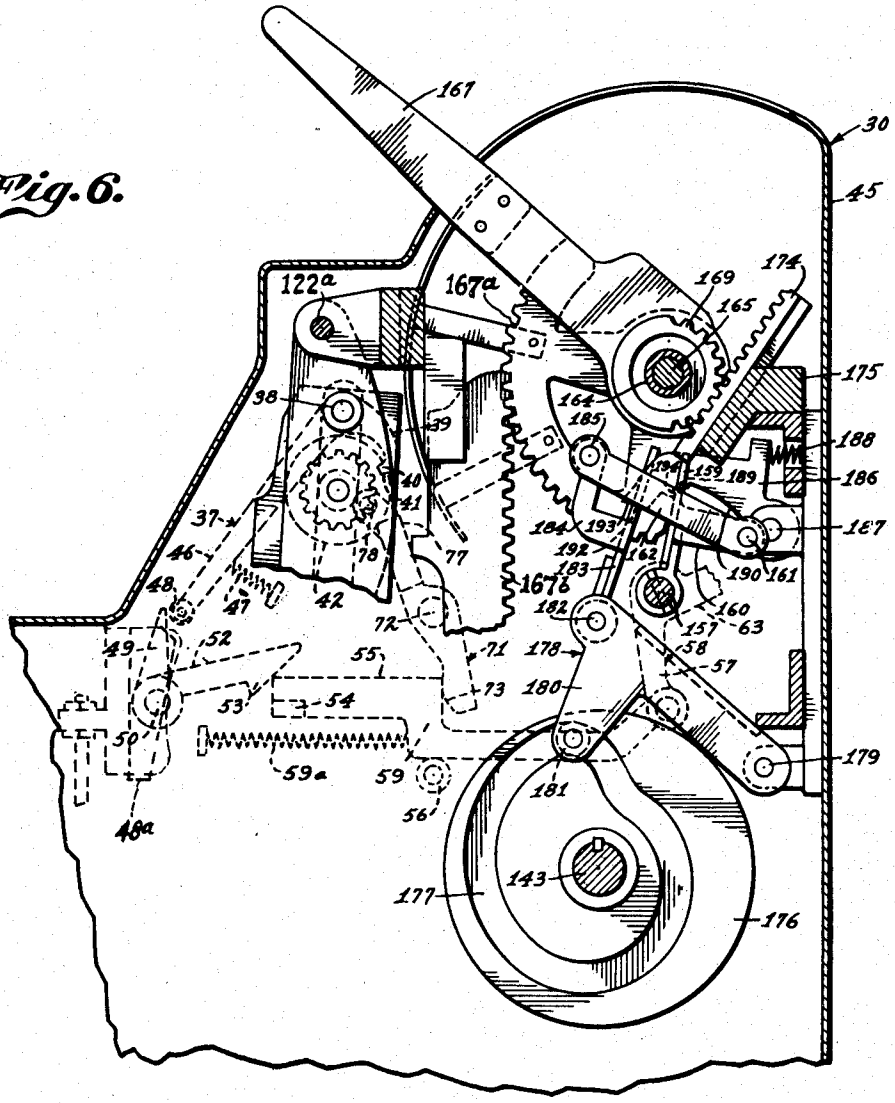
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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

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Fig. 6.



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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

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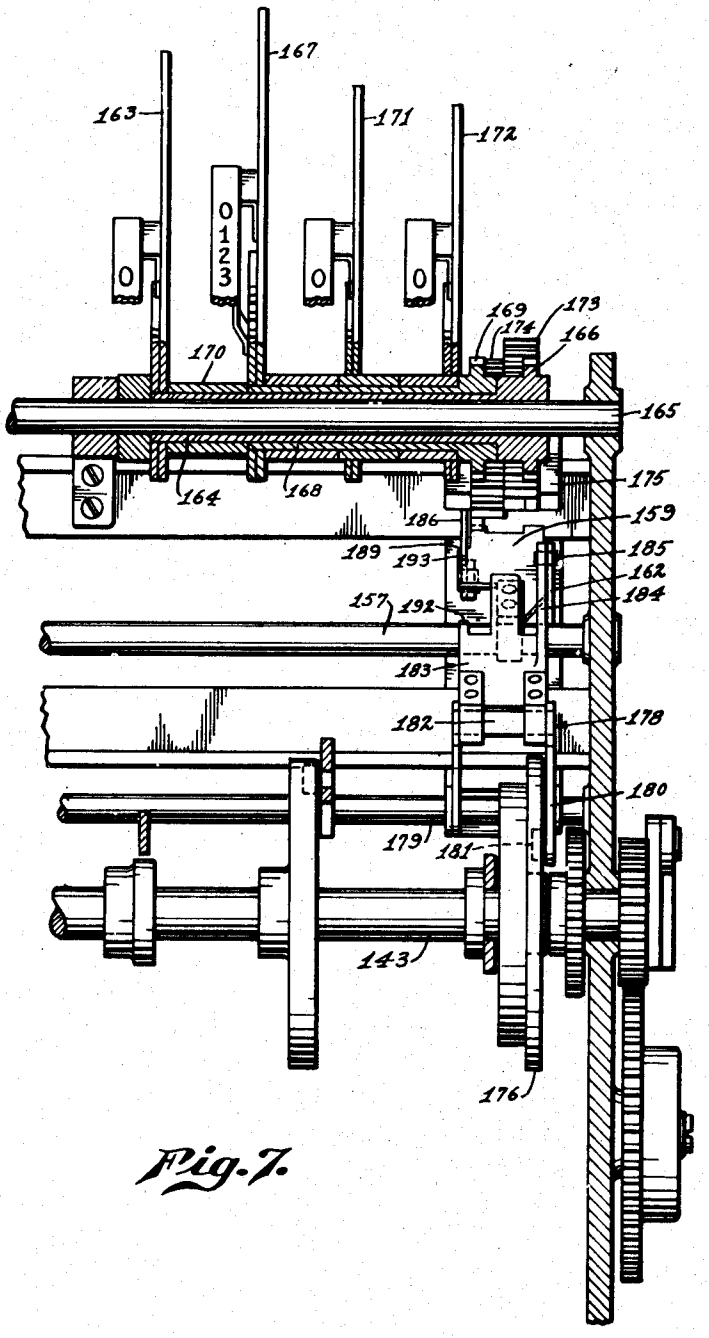


Fig. 7.

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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

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Fig. 8.

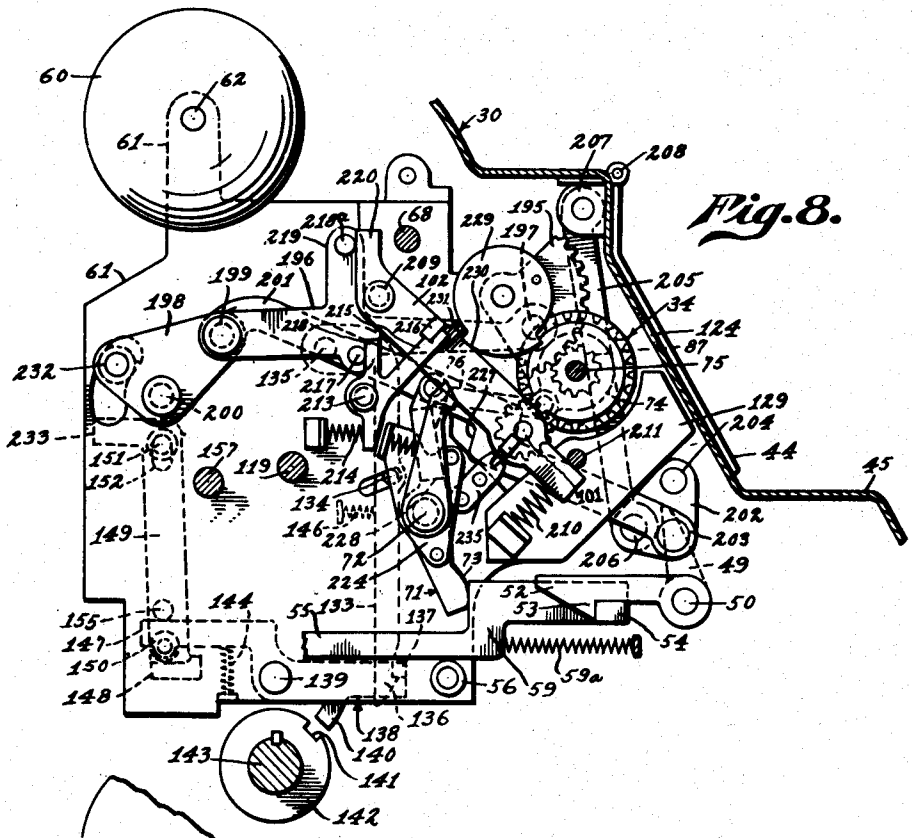
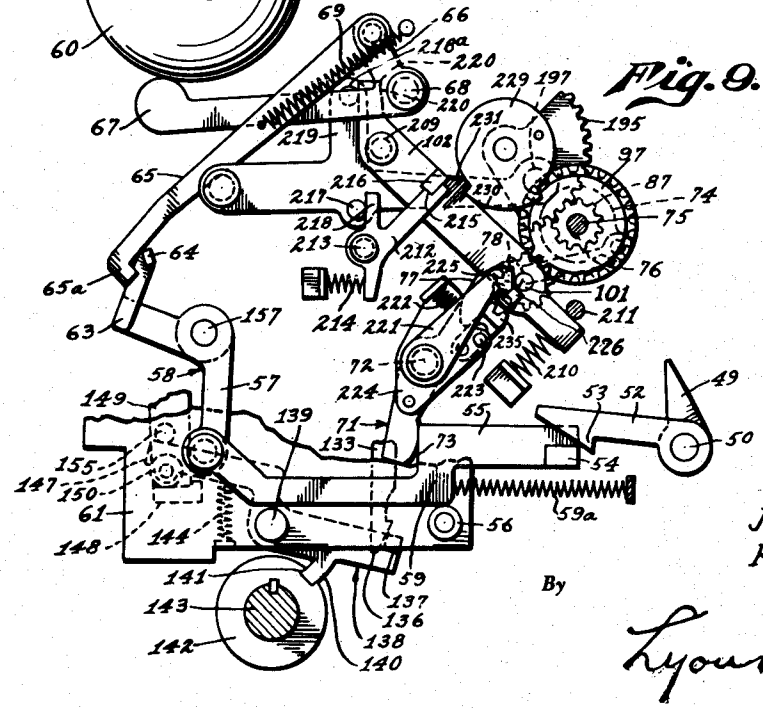


Fig. 9.



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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

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Fig. 10.

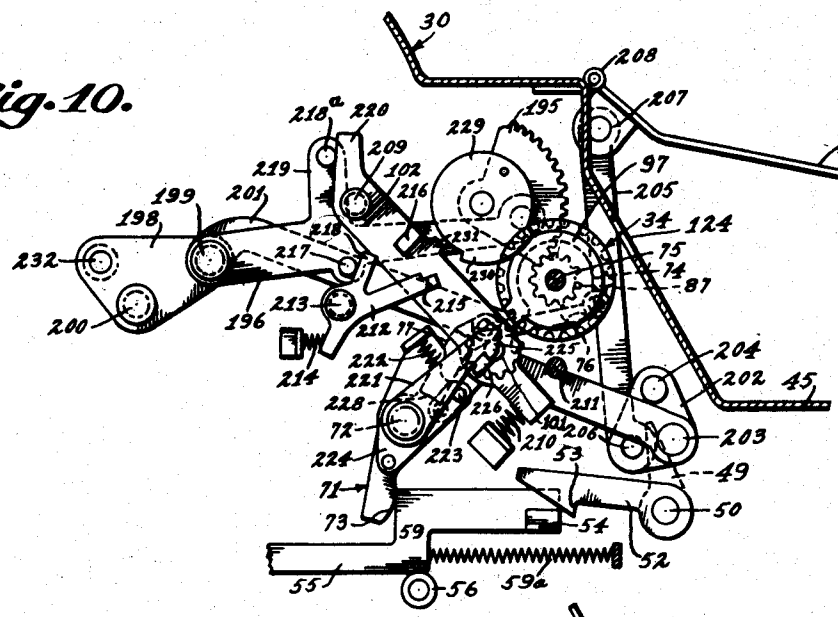
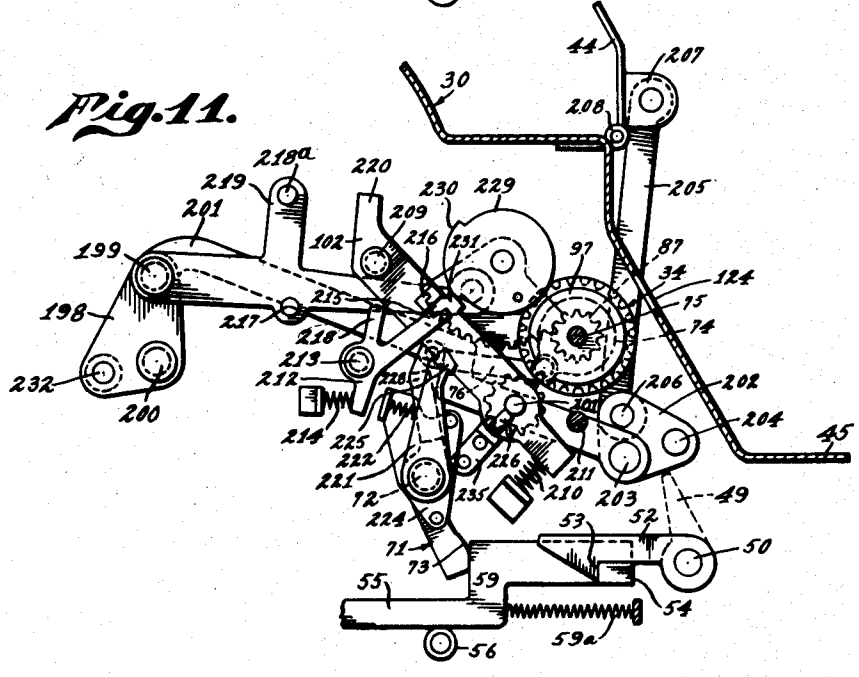


Fig. 11.



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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

Filed June 13, 1934 11 Sheets-Sheet 10

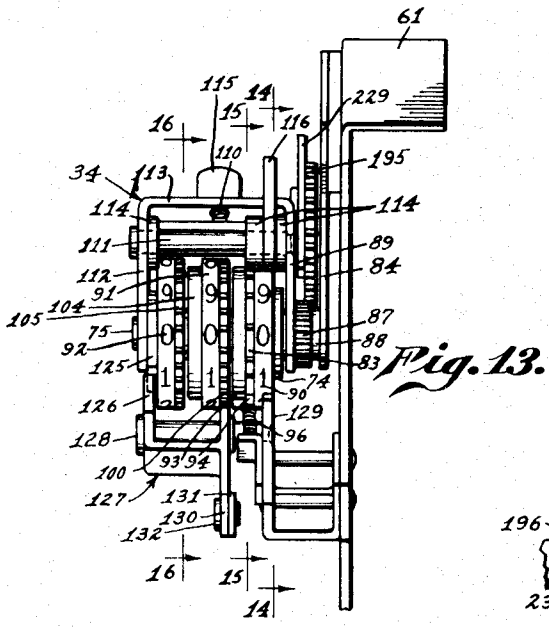


Fig. 13.

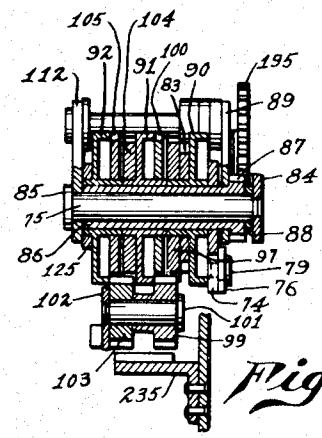


Fig. 12.

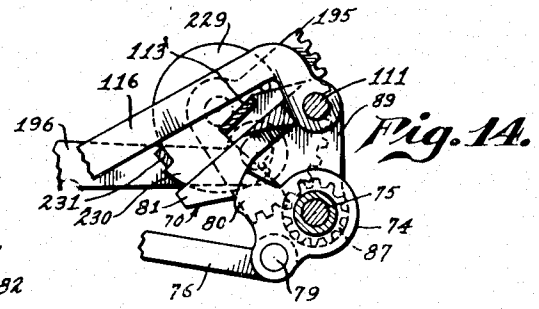


Fig. 14.

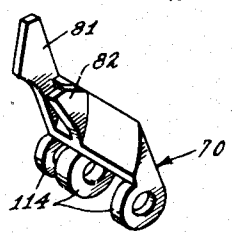


Fig. 17.

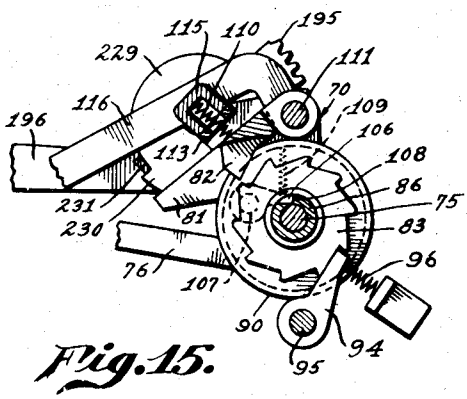


Fig. 15.

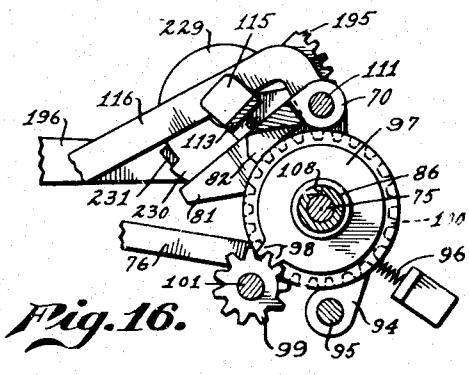


Fig. 16.

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LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

Filed June 13, 1934 11 Sheets-Sheet 11

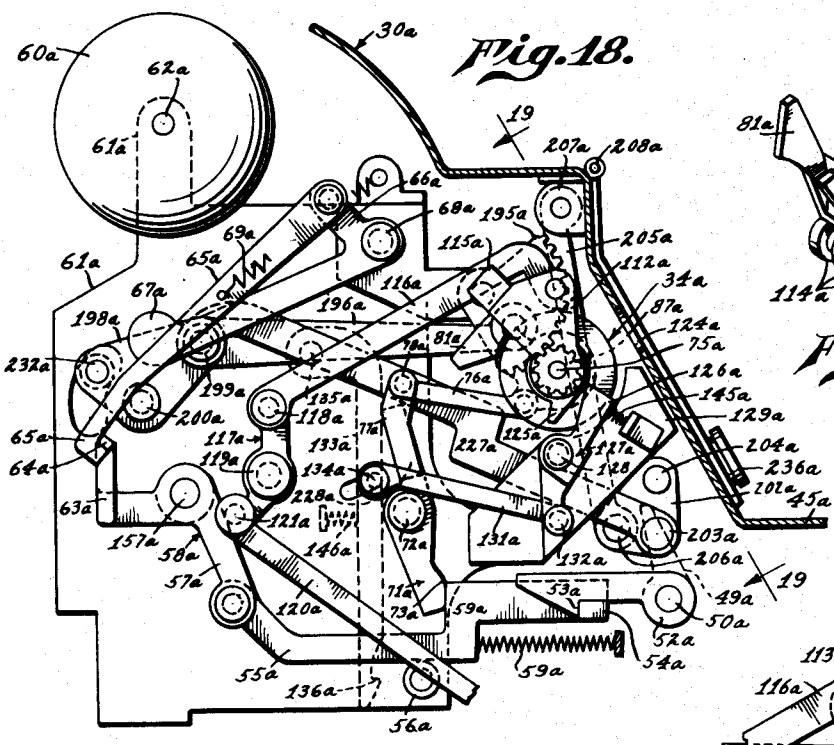


Fig. 18.

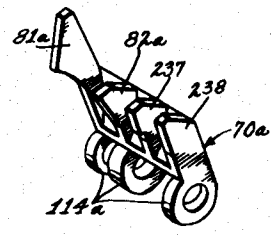


Fig. 23.

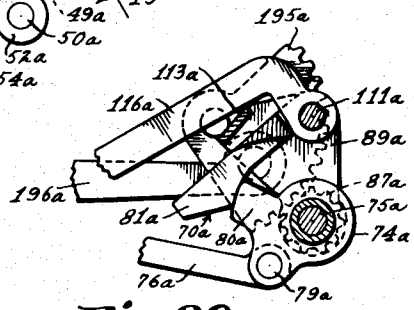


Fig. 20.

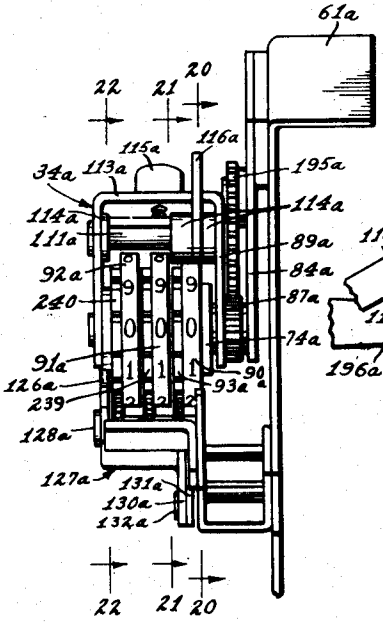


Fig. 19.

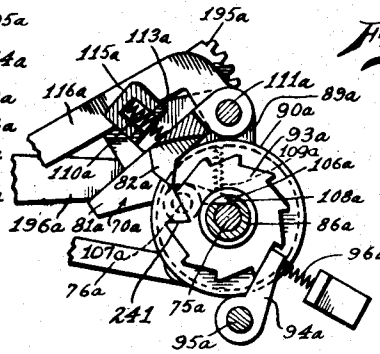


Fig. 21.

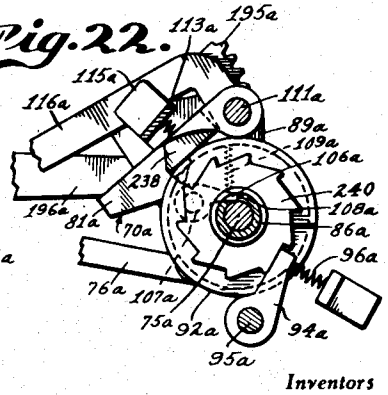


Fig. 22.

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Patented May 11, 1937 2,079,704

UNITED STATES PATENT OFFICE

2,079,704

LOCKING SYSTEM FOR A SELECTIVE DENOMINATION REGISTERING AND PRINTING MACHINE

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Application June 13, 1934, Serial No. 730,402

10 Claims. (Cl. 235—101)

This invention relates to a different form of locking system for use in controlling a selective denomination registering and printing machine of the general type illustrated and described in our copending application, Ser. No. 709,796, filed February 5, 1934.

The locking system of this invention, when utilized in the printing machine of our application in place of the system disclosed therein, has many important advantages, some of which we are setting forth below, while others will be readily appreciated from the specifications and drawings.

One of the principal advantages or objects is to provide a locking system in which the control of the machine may be transferred from the usual money register to a unit form of counter whereby, upon the shifting of the control from the money to the unit mechanism, the machine may be operated a predetermined number of times; also to provide a suitable form of alarm or signal device which will function simultaneously with the change in the control to notify the operative. The sounding of the alarm will indicate to the operative that there remains only a certain number of operations before the locking of the machine takes place. The machine selected for illustration is organized to operate 200 times after the alarm, but it will be appreciated that the machine may be readily organized to operate any number of times after the warning. It may be desirable to increase the number of operations to say 300 or 500 or even more, or on the other hand, in some instances, it may be preferable to lock the machine after it has functioned a lesser number of operations after the alarm. After the signal has called attention to the change in control, the operative may select the most important mail matter to be run through the machine thus insuring that at least this mail will not be held for want of postage. In most cases 200 operations is deemed sufficient to fully care for the most important pieces of mail matter found in the usual mailing department.

A further object is to remove the stress and jar of the final locking operation from the money register thus greatly reducing the wear and tear and liability of an inaccurate registration of this register. This is important. On the other hand the more simple unit counter may be made more rugged and even though this counter should fail to operate accurately the amount of postage dispensed will still be accurately registered in the two money registers.

A further object is to provide means for automatically reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, and to also provide means for rendering the selector inoperative to register a higher denomination than said predetermined lesser amount to which the selector means is automatically actuated.

A further object is to provide means for automatically resetting the unit counter and the denomination reducing means during the operation necessary to reset the money register.

The invention resides in the several combinations and associations of elements or groups of elements and/or mechanisms operatively related for attaining the aforesaid objects, and also for attaining other objects and advantages which will become apparent as the nature of the invention is more fully understood from the following description and accompanying drawings, wherein is set forth what is now considered to be a preferred embodiment. It should be understood, however, that this particular embodiment of the invention is chosen principally for the purpose of exemplification, and that variations therefrom in details of construction or arrangement of parts may accordingly be effected and yet remain within the spirit and scope of the invention as the same is set forth in the appended claims.

In the drawings:

Fig. 1 illustrates a front elevation view of the selective denomination printing and registering machine of our co-pending application into which the locking system of this invention has been assembled.

Fig. 2 illustrates a fragmental sectional view taken substantially in the plane of line 2—2 of Fig. 1.

Fig. 3 illustrates a fragmental sectional view taken substantially in the plane of line 3—3 of Fig. 1.

Fig. 4 illustrates a sectional view similar to Fig. 3 from which some of the operating elements of the machine have been removed to more clearly show the means for automatically returning the dollar and ten cent levers to zero and for locking them in their zero positions.

Fig. 5 illustrates a view similar to Fig. 4 but showing the device released and ready to be swung into operative position for returning the dollar and ten cent levers to zero.

Fig. 6 illustrates a view similar to Fig. 5 but showing the dollar and ten cent levers locked in their zero positions.

Fig. 7 illustrates a sectional view taken substantially in the plane of line 7—7 of Fig. 4.

Fig. 8 illustrates a sectional view similar to Fig. 2 from which some of the parts have been removed to more clearly show the relation of certain of the parts of the locking system when located in their normal operating positions.

Fig. 9 illustrates a sectional view similar to Fig. 8 but showing the bell striking mechanism and not some of the other mechanisms of Fig. 8.

Fig. 10 illustrates a sectional view similar to Fig. 8 but showing the unit counter resetting means in the operation of resetting the counter.

Fig. 11 illustrates a sectional view similar to Fig. 10 but showing the unit counter resetting means actuated to the limit of its travel.

Fig. 12 illustrates a sectional view of the unit counter and is taken substantially in the plane of line 12—12 of Fig. 2.

Fig. 13 illustrates a sectional view taken substantially in the plane of line 13—13 of Fig. 2.

Fig. 14 illustrates a fragmental sectional view taken substantially in the plane of line 14—14 of Fig. 13.

Fig. 15 illustrates a fragmental sectional view taken substantially in the plane of line 15—15 of Fig. 13.

Fig. 16 illustrates a fragmental sectional view taken substantially in the plane of line 16—16 of Fig. 13.

Fig. 17 illustrates a perspective view of the unit counter driving pawl.

Fig. 18 illustrates a section taken similar to that of Fig. 8 and shows a modified form of the locking means.

Fig. 19 illustrates a sectional view of the unit counter taken substantially in the plane of line 19—19 of Fig. 18.

Fig. 20 illustrates a sectional view taken substantially in the plane of line 20—20 of Fig. 19.

Fig. 21 illustrates a sectional view taken substantially in the plane of line 21—21 of Fig. 19.

Fig. 22 illustrates a sectional view taken substantially in the plane of line 22—22 of Fig. 19.

Fig. 23 illustrates a perspective view of the unit counter actuating pawl.

In our co-pending application, previously referred to, a postage printing machine was chosen for the purpose of illustrating and describing our printing and registering machine, and the same general form of the invention will be selected for the same purpose in the present application. It will be understood, however, that the machine may take different forms for different uses or purposes, although the fundamental conception of the invention will remain substantially the same.

The postage printing and registering machine will be referred to as an "omni", as in the previous case.

The omni of this invention is substantially identical to the omni of our co-pending application, except for those mechanisms associated with the locking system, the automatic return means for the dollars and tens of cents selector means, and the resetting mechanism. In other words, the locking and resetting mechanisms of our former omni have been replaced with a new form of locking means and resetting mechanism, and to these has been added an automatic return means for the dollars and tens of cents levers. The claims of this case are directed only to these new mechanisms in various combinations and not to the machine in general, and for this reason and, because of the complete description of the remaining portions of the machine in our co-pending application, the description will not be repeated herein, except as to any of the mechanisms and parts which are associated with the new features.

Referring to Figure 1, it will be noted that the omni 30 may be detachably mounted upon a power plant unit 31 in substantially the same manner as described in our co-pending application.

The omni may be manually actuated by the crank handle 32, shown in broken lines in Figure 1, whether connected to the power-plant or removed therefrom.

Locking system 33

One of the most important differences in the locking system 33 of this invention over our pending application is the use of a unit counter 34, shown in detail in several views on sheet 10 of the drawings, which is normally retained inactive as long as there remains registered in the subtracting register 35 a substantial amount of prepaid postage. When the value of the prepaid postage registered in the subtracting register falls below a predetermined amount, the unit counter is brought into operation whereby for each operation of the machine this counter will be actuated one unit. The particular unit counter shown is arranged to permit the machine to be actuated 200 times, whereupon the final locking of the machine will take place. This is an important advantage because it removes from the more delicate subtracting register all jar or stress developed during the locking operation, and thus the accuracy of the subtracting register may be more dependably relied upon. It is this subtracting register, together with an adding register 36 by which the post-office department checks and sets up the amount of postage used and purchased. The counter and two registers are mounted in alignment, as may be noted from Figure 1. This form of locking mechanism has a further important advantage in, first of all, notifying the operative when the unit counter is placed into operation, and, further, from the figure wheels of the unit counter the exact number of remaining impressions or actuations of the machine may be quickly and easily observed. Due to this feature, the operative can more expeditiously handle all important mail matter to insure its receiving the necessary postage indicia before the machine becomes finally locked. Knowing the number of operations remaining in the machine, the mail matter may be sorted to receive a most expeditious handling.

It should be noted that the machine may be operated after the unit counter is placed into operation 200 times independently of the value of the indicia being printed (within certain limits later to be explained), and the amount remaining registered in the subtracting register. In other words, after the unit counter is placed in operation, the subtracting register is relieved of all further connection with the locking mechanism.

The subtracting register is substantially in all respects like that of our co-pending application, with the exception of providing only a single tripping lever 37 pivotally mounted on the register frame, as by means of shaft 38. The forwardly and downwardly extending end portion 39 of the tripping lever is provided with a tooth 40 for the ten dollar numeral wheel and for each numeral wheel of higher order. The ten dollar numeral wheel is provided with a trip-

ping notch 41 located to register with its related tooth 40 when this wheel registers two, while the numeral wheels of higher order are each likewise provided with a tripping notch but differ from the ten dollar wheel by having their notches located in position to register with their related tooth 40 while registering zero. When the ten dollar numeral wheel registers two and all of the numeral wheels of higher order zero, the control of the machine will be transferred from this meter to the unit counter.

It will be understood that the tripping notches may be differently arranged to bring about the transfer of the control at any other selected value.

By this arrangement, the tripping lever 37 will be actuated when notch 41 turns into registration with the tripping lever tooth. This may take place at any value between $29.99½ and $20.00½ in a machine having a maximum printing and registering capacity of $9.99½. Of course, if the maximum value printable by the machine is greater or less than $9.99½, it may correspondingly change the range of tripping values.

The tripping lever is provided with a downwardly and forwardly extending lever arm 46, normally urged to rotate in a clockwise direction, as viewed in Figs. 4, 5, and 6, by spring 47. The lower end of arm 46 is provided with a roller 48. Arm 46, with its roller 48, serves two important purposes, the first of which is to maintain the teeth 40 of the tripping lever 37 clear of their related numeral wheels during the transfer period of the upward movement of the register, and second, to actuate cam lever 49 for tripping the unit counter and denomination reducing means into operation. For the purpose of accomplishing the first of the above purposes, a cam rail 48a is provided. As may be observed in Figure 4, roller 48 does not engage the cam rail when in its uppermost position but it brought into engagement with the rail during that portion of the upward stroke of the register during which the transfer mechanism of the register is operated, thereby lifting teeth of lever 37 clear of the numeral wheels.

The cam roller 48 is prevented from actuating cam lever 49 as long as there remains in the register a value exceeding 2999½, as in this event one or more of the teeth 40 will engage the periphery of their numeral wheels and thus prevent the tripping lever from swinging sufficiently to actuate lever 49. If, however, the ten dollar wheel registers 2 and all wheels of higher order register zero, the additional swing of tripping lever 37, permitted by the teeth 40 swinging into their related numeral wheel notches 41, will cause roller 48 of arm 46 to engage and actuate cam lever 49, thereby tripping the unit counter and denomination reducing means into operation.

As may be observed in Figures 3, 4, 5, and 6, the roller 48 will rise sufficiently above the upper end of cam rail 48a to permit this additional motion of the tripping lever 37. These figures also show that the upper end of the cam rail 48a is sufficiently tapered or rounded off whereby roller 48 may nicely ride upon cam rail 48a during the succeeding operations of the machine.

To accomplish this tripping action, the cam lever 49 is fastened upon cross shaft 50, which shaft has likewise fastened thereon in spaced relation to the cam lever a latch member 52 having tooth 53, which normally overlies the transversely projecting finger 54 of the sliding link 55. The forward end of this link is supported upon a suitable roller 56, while the rear end thereof is pivotally connected to the lower arm 57 of bell crank lever 58. Against one face of the forward offset portion 59 of the sliding link acts the spring 59a to push the link rearwardly when released from the latch member 52. This rearward motion of the sliding link is made use of for actuating an alarm bell and for placing the unit counter into operation, as well as for bringing the denomination reducing means into operation.

Alarm and actuating means therefor

An alarm bell 60 may be of any suitable type and supported upon the omni frame 61 by pin 62.

The alarm is sounded simultaneously with the placing of the unit counter into operation.

The means which are actuated by the sliding link 55 for sounding the alarm may include providing the bell crank lever 58 with an angular arm 63, from which there is formed a transversely extending projection 64. The lower end of link 65 is provided with a hooked portion 65a adapted to hook over the projection 64, while at its opposite end is pivotally connected to the arm 66 of the bell clapper 67. The clapper is pivotally mounted upon the omni frame 61, as by a pin means 68. A spring 69 acts at all times to urge link 65 upwardly and forwardly. When the subtracting meter tripping lever 37 functions to release the sliding link, this link will be moved rearwardly due to the action of its spring 59a and to thereby rock bell crank lever 58 to in turn permit the hooked link 65 to move upwardly and forwardly under the influence of its spring means 69 and to thereby swing the bell clapper into ringing engagement with the bell (Fig. 9).

As may be observed in Fig. 9, the arm projection 64 of bell crank 58 moves away from the hooked portion 65a of link 65 for two reasons, namely, to allow the full movement of the sliding link 55 and associated parts, and for permitting the bell clapper to give the bell a single smart blow. Due to the location of spring 69 with relation to the pivotal center of link 65, the hook-shaped end 65a of the link will be maintained in position to be reengaged by projection 64 when the parts are returned to their initial positions.

The means for placing the unit counter into action

The means for placing the unit counter into action is most clearly shown in Figs. 2, 8, 9, 10, 11, and 14, and may include any suitable means for rendering the unit counter driving pawl 70 active, which pawl is normally maintained inactive. The means herein disclosed may include a rocking lever 71 pivotally mounted on shaft 72. The lower forward face of this lever is provided with a cam surface 73 adapted to engage the rear face of the offset portion 59 of the sliding link 55 (Fig. 2). By this arrangement, the rocking lever will be rotated in a clockwise direction (Fig. 2) when the sliding link is released in the manner previously described. This motion is utilized to actuate a cam disc 74 (Fig. 14) journaled upon the unit counter-shaft 75 by means of link 76. The link is pivotally connected to the upper end 77 of rocking lever 71, as by a suitable pivot pin 78 (Fig. 2), and to the cam disc by means of pivot pin 79. The cam disc 74 is provided with a radial projecting cam

surface 80 (Fig. 14), which normally underlies the arm 81 to retain the pawl elevated sufficiently to maintain ratchet tooth 82 thereof free of the unit counter ratchet wheel 83. The operation of this portion of the mechanism may be summarized briefly as follows:

When the subtracting register turns to present to the window the figure "0" for all value wheels above the tens of dollars wheel, and this wheel is turned to show the figure "2" representing $20.00, the tripping lever 37 will function to release the sliding link 55. It will be appreciated that the amount indicated by the value wheels below the tens of dollars wheel has no bearing upon the tripping function.

As soon as the sliding link is released, it moves rearwardly, imparting motion to the rocking lever which through link 76 rotates the disc cam 74, thereby swinging the cam surface 80 free from the arm 81 of the unit counter driving pawl 70. In Figs. 2, 4, 8, and 14 the unit counter pawl releasing means is shown in position to retain the pawl in its inoperative position, while in Figs. 5, 6, and 9 this means is shown in its pawl releasing position.

Unit counter 34

The means for actuating the unit counter driving pawl will be described following the description of the counter.

The unit counter 34 is suitably mounted within the omni casing so as to be in alignment with the substracting and adding registers when the latter are in their positions of rest, as is clearly shown in Fig. 1. However, the unit counter need not be so arranged, but with the counter and two registers in alignment it gives the machine a more pleasing appearance.

Several detailed views of the unit counter are given on Sheet 10 of the drawings wherein it may be noted that the unit counter shaft 75 has one end turned down for securely riveting the shaft at this end to a supporting bracket 84, which bracket may be secured to the omni frame 61 in any approved manner. The opposite end of shaft 75 may be provided with a head 85 to retain the several devices journaled thereon in proper position. A sleeve 86 is journaled on shaft 75, and at one end is provided with a driving pinion 87 and between this pinion and the bracket member 84 may be mounted a washer 88. There are several elements journaled on the sleeve, which elements (Fig. 12) starting from the pinion end of the sleeve include an arm 89 of the driving pawl support, a cam disc 74, a unit wheel 90, a tens wheel 91, and a hundreds wheel 92. A ratchet wheel 83 is fastened upon the hub of the unit wheel 90, and it is this ratchet wheel with which the unit counter driving pawl 70 engages when released to turn the unit wheel one-tenth of a revolution for each operation of the machine.

To prevent the ratchet wheel 83 from rotating in a clockwise direction, as viewed in Fig. 15, a pawl 94 is journaled upon a suitable cross shaft 95 and is yieldingly urged into engagement with the teeth of the ratchet wheel by means of spring 96. It will be understood that on each of the numeral wheels there is engraved a series of consecutive numerals from "0" to "9".

There is also mounted upon the hub of the units wheel 90 a Geneva driver 97 (note Fig. 16). This driver is provided with two teeth 98 which, upon revolution of the units wheel, engage and rotate the Geneva pinion 99. The pinion 99 is made sufficiently broad so as to engage the teeth of gear 100 of the tens wheel. This arrangement of parts is commonly referred to as a transfer mechanism and for each revolution of the units wheel causes the tens wheel to be moved one tenth of a revolution. It will be understood that the gear 100 is suitably fastened to the tens wheel so that any motion of this gear is transmitted to the wheel.

The Geneva pinion 99 is journaled on a short shaft 101, which is suitably mounted upon the forward end of the re-setting lever 102. The re-setting lever and its associate parts will be more fully described later.

Journaled beside the Geneva pinion 99 is a second Geneva pinion 103, and it is this second Geneva pinion which transfers the motion from the tens wheel to the hundreds wheel in a similar manner to that of the units and tens wheels. In this connection, it will be pointed out that the tens wheel 91 has suitably fastened thereto a Geneva plate 104, having two teeth adapted to engage and rotate the Geneva pinion 103 after each full revolution of the tens wheel, while the hundreds wheel is provided with a gear 105 which is at all times in mesh with the Geneva pinion. By this arrangement, each revolution of the tens wheel 91 will cause the hundreds wheel to rotate one tenth of a revolution.

It may be observed from Fig. 12 that each of the numeral wheels has been counter-bored to receive a re-setting pawl 106. One of these pawls 106 is clearly shown in Fig. 15, and it will be understood that the construction and arrangement of all of the pawls are identical. The pawl 106, shown in Fig. 15, is pivotally connected to the units wheel 90 by means of a suitable pivot pin 107 and is yieldingly urged into engagement with a ratchet groove 108 formed longitudinally of the sleeve member 86 by a suitable spring means 109.

The purpose of the pawls 106 is for re-setting the numeral wheel to "0" when a new amount of postage purchased is being set up in the subtracting register. This operation is taken care of automatically by means later to be described.

Unit counter driving mechanism

A driving mechanism is provided for reciprocating the unit counter actuating pawl 70 each time the machine is operated, but through the means previously described the actuating pawl 70 is normally maintained above the teeth of the units wheel ratchet 83. However, when the disc cam 74 is rotated, the cam surface 80 thereof will be carried from under the arm 81 of the driving pawl 70, thus permitting the pawl to swing into engagement with the teeth of the ratchet wheel 83. A spring 110 yieldingly urges the pawl in the direction of the ratchet wheel, as may be clearly observed in Fig. 15.

The driving pawl 70 is pivotally journaled on a short shaft 111 carried by the spaced pawl supporting arms 89 and 112 (Fig. 12).

The pawl supporting arm 89 is journaled on the sleeve 86 adjacent the pinion 87 thereof, while the pawl supporting arm 112 is journaled directly upon the unit counter-shaft 75 adjacent the head 85 thereof.

As is most clearly shown in Fig. 13, arms 89 and 112 may be connected by a bridge piece 113 or the arms and bridge piece 113 may be formed of a single member.

The short shaft 111 is carried by these two arms adjacent the bridge piece 113, and it is upon this shaft which the driving pawl 70 is

journaled by means of three spaced bearing lugs 114.

One end of spring 110 which acts to force the driving pawl 70 into engagement with its ratchet wheel is carried by a cap member 115 suitably fastened to the bridge piece 113 (note Figs. 13 and 15).

By supporting the short shaft 111 on arms 89 and 112 and by journaling these two arms concentric with a unit counter shaft 75, the pawl may be oscillated back and forth in concentric relationship to the periphery of the ratchet wheel 83. The means for oscillating the driving pawl may include a link 116 with one end journaled on the short shaft between two of the driving pawl bearing lugs 114 (note especially Fig. 13), while the other end of this link may be pivotally connected to the upper end of the bell crank lever 117 by a suitable pin 118, while the bell crank member may be in turn journaled upon a suitable pin or shaft 119. The lower arm of the bell crank lever is pivotally connected to one end of link 120 by a suitable pin means 121, while the other end of link 120 is pivotally connected to the swing frame 122 of the substracting register 35, by a suitable pivot pin 123.

By this arrangement with each oscillation of the subtracting meter swing frame 122 the unit counter driving pawl will be given a sufficient stroke to advance the ratchet wheel 83 to the extent of one full tooth. It will be appreciated that the ratchet wheel 83 is provided with ten equally spaced ratchet teeth whereby upon each action of the machine the units numeral wheel 90 will be rotated by the ratchet one tenth of a revolution, and to thereby bring to view before the casing window 124 the next succeeding numeral engraved on the periphery thereof.

The meter swing frame 122 is pivotally mounted at its upper end upon pivot shaft 122*a*, Figure 3. A driving link 122*b* is pivotally connected to the lower end of frame 122. The driving link is bifurcated to straddle shaft 143 and to be supported thereby. A cam roller 122*c* plays in cam groove 122*d* of the cam wheel 176. Due to this arrangement, with each operation of the machine the swing frame will be swung forwardly from its position as illustrated in Figure 2 and later returned to its initial starting position.

The register swing frame 122 provides a convenient source of motion for the unit counter actuating pawl. It is to be understood, however, that the motion for driving the unit counter actuating pawl may be taken from any of the other suitable moving parts of the omni driving mechanism.

When the subtracting counter shows a value registered therein well above the tripping point for the unit counter, the unit counter driving pawl will be held out of engagement by the cam disc 74, as previously described, and while so held by this disc the arm 81 of the pawl will ride back and forth on the cam surface 80 of the disc during each operation of the machine, and in this way the ratchet tooth 82 of the pawl will be held out of engagement with the teeth of the units wheel driving ratchet 83.

Locking means for the omni driving mechanism

When the unit counter has been actuated two hundred times it functions to bring into action means for locking the driving mechanism of the omni, which latter means not only lock the driving mechanism of the omni but may also act to disconnect the driving clutch tripping mechanism of the unit power plant 31 when the machine is mounted thereon.

We will first describe the locking mechanism and, secondly, the means for rendering the power plant clutch tripping mechanism ineffective.

Referring especially to Figs. 2, 12, and 13, the locking means for the omni driving mechanism may include a locking cam 125 fastened to the rear face of the hundreds numeral wheel. The relation of the high point of cam 125 to the hundreds wheel is such that when the numeral representing two hundred appears before the units counter window 124, this portion of the cam will engage the upper end 126 of a bell crank lever 127, which lever may be journaled upon the pivot pin 128 carried by a frame bracket 129 (Fig. 13). The lower end 130 of the bell crank lever is pivotally connected to a connecting rod 131 by a pivot pin 132, while the opposite end of this connecting rod is pivotally connected to a depending latch lever 133 (Fig. 2) as by pivot pin 134. The depending latch lever is most clearly illustrated in Figs. 2, 8, and 9, and in these figures it may be observed that the latch lever is pivotally mounted at its upper end to the frame by a suitable pivot pin 135, while at its lower end is provided with a latch tooth 136 normally engaging a projecting lug 137 formed on the side face of the locking lever 138, which lever is pivotally mounted on the frame, as at 139.

From the lower edge of the locking lever projects a locking tongue 140 normally retained out of engagement with the locking notch 141 formed in the locking wheel 142, which wheel is securely fastened to the main driving shaft 143 of the omni. As illustrated in Figs. 2 and 8, the locking tongue 140 is maintained clear of the locking notch 141, thereby leaving the omni driving mechanism free to rotate.

It will be understood that the locking notch will register with the locking tongue, as illustrated in Figs. 2 and 8, during the time the machine is at rest, that is, between each operating cycle thereof.

After the unit counter has been operated two hundred times, the locking cam 125 will engage the upper end 126 of the bell crank lever 127 and rotate this crank in a clockwise direction from its position, as illustrated in Fig. 2, and through the connecting rod will swing the depending latch lever 133 rearwardly to release the projecting lug 137 from the latch tooth 136, and to thereby permit the locking lever to rotate in a clockwise direction under the influence of spring 144 to swing the locking tongue into locking engagement with the notch 141.

The relation of these parts when actuated to the locking position is clearly shown in Fig. 9.

By this arrangement, the main driving shaft of the omni is securely locked against rotation and may only be released when a new value of postage has been set up in the subtracting register in a manner later to be described.

A spring means 145 may be provided to yieldingly urge the upper end of the bell crank lever 127 into the path of travel of the locking cam 125, and a suitable spring means 146 may be provided for yieldingly urging the latch lever 133 into latching engagement with a projecting lug 137 of the locking lever.

From the above description, it will be appreciated that the final locking of the omni is brought about by the locking cam 125 of the unit counter

and that this locking action is entirely independent of the subtracting register, and the several parts of the locking mechanism may be made sufficiently rugged to withstand for a long period of time the jar and stress upon these parts when actuated to lock the machine against further use.

As the omni is now locked, it will be appreciated that it would be inadvisible to permit the omni driving clutch of the power plant to be brought into operation, and for this reason means are provided which will function simultaneously with the locking action to render the clutch tripping mechanism ineffective to bring the driving clutch into operation, and for this purpose the rear end 147 of the locking lever 138 is sufficiently offset and extended to overlie the horizontal cam surface 148 of the floating link 149.

Interposed between the end 147 of the locking lever and the cam surface 148 of the floating link there may be provided an anti-friction roller 150. The upper end of the floating link is pivotally carried by the pivot pin 151 in a suitable guide slot 152 formed in the frame of the machine, and this arrangement permits the floating link to be raised or lowered and also allows the lower end to swing freely. The link is normally urged upwardly by a long diagonally extending spring 153 connected to the floating link at one end by a suitable pin means 154 (Fig. 2). The floating link is prevented from moving upwardly during the normal operation of the machine by the contact of its cam surface 148 with the anti-friction roller 150 of the locking lever 138.

When the locking lever is released to lock the machine, the rear end 147 thereof will swing upwardly into engagement with the projecting pin 155, which extends from the side face of the floating link just above the upper surface of this portion of the locking lever, thereby lifting the floating link to the position shown in Fig. 9.

Acting against a lower surface of the floating link cam portion 148 is a clutch cut-out pin 156. The clutch cut-out pin 156 is normally maintained depressed by the floating link aganist the action of suitable spring means (not shown) which yieldingly urge the pin upwardly. When the locking lever swings into locking position, the floating link is lifted and thereby releases the clutch cut-out pin, permitting it to move upwardly under the influence of its spring means to render the clutch tripping mechanism (not shown) inoperative.

From the above description it will be appreciated that after the unit counter has been actuated two hundred times the driving mechanism of the omni will be positively locked to prevent further use of the machine until an additional amount of postage has been purchased and the parts returned to their original operative position, and simultaneously with the locking of the machine the power plant clutch tripping mechanism will be rendered inoperative to place the omni driving clutch into operation.

In the present drawings, the locking cam 125 is located to bring about the locking action of the machine when the unit counter registers two hundred operations. It will be understood, of course, that the relation of the locking cam to the hundreds wheel may be changed whereby a greater or a less number of operations of the machine may be had before bringing about the locking operation. In some instances, it may be desirable to provide only a single units wheel in the unit counter and to provide this units wheel with a locking cam similar to that of 125 whereby the machine may be locked from one to ten actuations after placing the unit counter in operation.

Means for reducing the maximum denomination which may be printed during a single operation of the machine

Before describing the denomination reducing means, a brief description of the denomination selecting means will be given.

As the selector means for each denomination is substantially like the other selector means, the description of the tens of cents selector means will suffice for all.

Fastened to the tens of cents selector lever 167 is a gear segment 167*a* meshing with the selector rack 167*b*. Below the gear segment is a pinion 167*c*, likewise meshing with the selector rack and fastened upon a suitable transverse shaft 167*d*. A second selector rack 167*e* is slidably mounted in alignment with the tens of cents numeral wheel gear 167*f* and is provided with gear teeth upon its front and rear faces. The rear set of gear teeth is in mesh with a driving pinion 167*g*, which is directly in back of pinion 167*c* as viewed in Figure 3. The driving pinion 167*g* is fastened upon shaft 167*d* and is turned thereby to raise or lower the second selector rack 167*e*. The front face of this second selector rack is provided with gear teeth 167*h* which are normally maintained out of range of the tens of cents gear wheel 167*f*. As the tens of cents selector lever 167 is swung in a clockwise direction, as viewed in Figure 3, through the train of mechanism just described, the second selector rack 167*e* will be lifted the distance of one tooth for each number indexed upon casing 45 adjacent this lever. It will be understood that there is a third selector rack substantially like the second selector rack 167*e* which is positioned to be engaged by the related numeral wheel gear of the adding register and a third pinion mounted upon shaft 167*d* for actuating this rack in the same manner as the second selector rack. In this way the second and third selector racks 167*e* may be shifted from their initial positions, wherein none of their teeth 167*h* will engage the tens of cents gears 167*f*, to a position wherein from one to nine of their teeth will be in the path of gears 167*f*, depending upon the positioning of the selector lever. Thus, the positioning of the selector lever 167 adjacent any one of the figures indexed upon the casing will cause a corresponding entry in the adding and subtracting registers during the operating cycle of the machine.

Unless means were provided for reducing the maximum denomination which may be printed during a single operation of the machine, the unit counter would have to be placed into operation at a considerably higher value in order that two hundred impressions of the maximum denomination which may be printed by the machine would not exceed the money value registered in the register at the time the unit counter is placed into action. For example, with the maximum printing value of $9.99½, the transfer of the control from the subtracting register to the unit counter would have to take place at practically $2.000.00 to insure the machine against an overdraft. This, of course, in most instances would be undesirable and, therefore, we provide means for reducing the printing capacity of the machine to a value not to exceed 9½¢. Multiplying 9½¢ by 200 will give a value of $19.00, this being the point at which the trans-

fer of the control from the subtracting register to the unit counter may take place; however, in the present embodiment of the invention this transfer of the control will take place at the first value below $30.00. In other words, just as soon as the tens of dollars wheel of the subtracting register turns to present the numeral "2" to the window, the transfer will take place independently of the value registered in the numeral wheels of lower order than that of the tens of dollars wheel as, for example, the transfer may take place at any value between $29.99½ and $20.00½. When the transfer does take place, there should remain in the subtracting register not less than $19.00 to insure against an overdraft.

A denomination reducing means are actuated automatically at the time of the transfer of the control from the subtracting register to the unit counter, and this operation is brought about by a control mechanism actuated by the rearward movement of the sliding link **55**, and the bell crank lever **58**, which is keyed to the transverse shaft **157** (note Figs. 2, 3, 4, 5, 6, and 7).

The transverse shaft **157** extends across the full width of the machine, and there is fastened to the end of this shaft adjacent the right hand side of the machine a crank arm **158** extending upwardly and carrying a locking plate **159** and also a rearwardly extending arm **160**, to which is pivotally connected, as by means of pivot pin **161**, a drag link **162**, which link is pivotally connected to means for positively swinging the dollar and ten cent denomination selector means from any setting thereof to their zero positions.

We will now describe the mechanical means for positively returning the dollar and ten cent levers from any setting to which they may have been previously actuated to their zero positions.

Referring particularly to Fig. 7, it will be noted therein that the dollar selector lever **163** is fastened to a sleeve **164** journalled upon transverse shaft **165**, and has suitably fastened to the end thereof a sectoral gear **166** while the tens of cents selector lever **167** is fastened to a shorter sleeve **168**, which in turn is journaled upon the periphery of the dollar lever sleeve **164** and securely fastened upon the end of this sleeve is the tens of cents sectoral gear **169**. The two sectoral gears **166** and **169** are maintained in working engagement by a bushing **170**, which is provided between the dollar selector lever and the tens of cents selector lever to maintain these parts in properly spaced relation.

A cent selector lever **171** and the half cent selector lever **172** are each independently journaled upon the periphery of the tens of cents selector lever sleeve. Each of the selector levers carries a quadrant gear adapted to mesh with their respective selector racks of the denomination selector means, as is fully described in our co-pending application and need not be repeated here.

In mesh with the dollar sectoral gear **166** is a rack **173**, while in mesh with the tens of cents sectoral gear **169** is a similar and independent rack **174** (Fig. 7).

These racks are slidably supported in side by side relation in a groove bearing block **175**. In Figs. 3, 4, 5, and 6 it will be noted that racks **173** and **174** are inclined upwardly and when their respective selector levers are in their zero positions the racks are maintained in their elevated positions. In Figs. 3, 4, 5, and 6 the tens of cents selector lever is shown in the position it would occupy when printing a 30¢ indicia,—in other words, at its 30¢ position, and in these figures it will be noted that rack **174** has moved downwardly from its upper position.

Means are provided which may be brought into action for returning either or both of the racks to their elevated zero positions simultaneously with the transferring of the control from the subtracting register to the unit counter.

These means may include a cam wheel **176** fastened to the main drive shaft **143** of the omni, and formed in the side face of the cam wheel is a cam groove **177** of appropriate outline to give the cam lever **178** sufficient travel to cause the racks **173** and **174** to be moved the full extent of their maximum travel.

The cam lever **178** may be pivoted to the machine frame, as at **179**, and is provided with a depending arm **180** for the support of a cam roller **181**, which roller is adapted to travel in the cam groove **177**. Pivotally connected to the cam lever at **182** is a swing link **183** and this link is provided with an offset arm **184**, which is pivotally connected to the drag link **162** of the control mechanism, as by a suitable pivot pin **185**.

With each rotation of shaft **143** the cam wheel **176** will make a complete revolution and thus oscillate the cam lever and with it the swing link **183**. However, as may be noted in Fig. 3, the drag link **162** will maintain the swing link clear of the ends of racks **173** and **174**.

It may be observed in Fig. 7 that the swing link **183** is of sufficient width to engage both of these racks when permitted to move into alignment with the ends thereof, but during the normal operation of the machine the swing link **183** will be maintained out of line with the adjacent ends of these racks (Fig. 3). However, when the amount registered in the subtracting register falls below the predetermined value, the control means will function to swing this link **183** into alignment with the adjacent ends of racks **173** and **174**, and should one or both of these racks be actuated due to the setting up of a value by either the dollar or tens of cents selector levers, the link **183** will engage these racks and return them together with their associated selector mechanisms to their zero positions.

After the swing link has functioned to return the selector levers to their zero positions, means are provided for locking the racks and thereby the levers from further operation until the machine has been re-set in a manner later to be described.

Selector locking means

The parts so far described are so arranged that during the normal operation of the machine they will remain ineffective but simultaneously with the setting of the unit counter into operation will function to return the dollar and tens of cents levers to their zero positions and to lock these levers against further use.

The locking means may include the locking plate **159** previously referred to, which is swung from its normal ineffective position, as illustrated in Fig. 3, upon the release of the sliding link **55**, as previously described, to its position as shown in Fig. 5, and finally swung to the position as shown in Fig. 6. A latch means **186** is provided to engage and control the swinging motion of locking plate **159** and in this way to bring about first the alignment of the swing link **183** with the adjacent ends of racks **173** and **174**, and upon completion of the return movement of these racks to permit the locking

plate 159 to swing directly into the path of travel of these racks.

The latch means may be pivoted to the frame by a suitable pivot pin 187 and by spring means 188 may be yieldingly urged to rotate or swing in a counterclockwise direction, as viewed in Figs. 3, 4, 5, and 6. Locking plate 159 is provided with a shoulder 189, against which the curved surface 190 of the latch member normally rides. The curved surface 190 is interrupted by a shoulder 191, and it is against this shoulder that the locking plate is swung upon the releasing of the sliding link 55 (Fig. 5) to rock the swing link 183 into alignment with the ends of racks 173 and 174. The swinging motion of the locking plate 159 is transmitted to swing link 183 through the drag link 162, as previously described, and thereby when the locking plate is swung into engagement with shoulder 191 of the latch member, the swing link will be maintained in alignment with the selector racks 173 and 174 and during the rotation of the cam wheel 176 will be thrust upwardly to engage and return any of the racks to their normal zero positions, whereupon the shoulder 192 of the swing link will engage the downwardly projecting portion 193 of latch member 186 and lift this member sufficiently to elevate shoulder 191 free of shoulder 189 to thereby release the locking plate which as a result thereof will swing until it engages a second shoulder 194 of latch member 186, as clearly shown in Fig. 6, to thereby permit the locking plate 159 to rock sufficiently to bring the upper end thereof directly below the adjacent ends of racks 173 and 174 and to thus lock the racks and through the racks the selector mechanism against further operation.

The locking of the dollar and tens of cents lever does not affect the cent and half cent levers and their respective selector mechanisms, and, therefore, during the 200 actuations of the machine before it becomes finally locked the cent and half cent selector levers may be actuated to bring about the printing of any denomination postage indicia from ½¢ to 9½¢. This range of values which may be printed will cover the general run of mail matter.

The operation of the denomination reducing and locking mechanism may be briefly stated as follows: When the tens of dollars wheel 42 of the subtracting register turns to bring the notch 41 thereof into registration with the tooth 40 of the tripping lever 37, this lever will be swung in a clockwise direction from its position, as indicated in Fig. 4 to that indicated in Fig. 5, under the influence of the compression spring 47. This swinging motion of the tripping lever brings the cam roller 48 into engagement with the cam lever 49 to swing the cam lever in a counter-clockwise direction, as viewed in Figs. 4 and 5, against the action of the cam lever spring 51, with the result that shaft 50 will be rotated and in turn will rotate the latch lever 52 fastened thereon. As the latch lever is rotated from its position, as illustrated in Fig. 4 to that of Fig. 5, the tooth 53 thereof will be lifted clear of the projecting finger 54 of the sliding link 55. This action will release the sliding link which will be urged rearwardly in response to its compression spring 59*a*. The rearward motion of link 55 will be limited first by the engagement of a locking plate 159 with the latch member shoulder 189, and, secondly, after the locking plate is released from the above shoulder by this plate engaging the second shoulder 194 of the latch. In other words, the rearward motion of the sliding link is interrupted during the return of the dollar and tens of cents selector levers to their zero positions. The locking plate 159 is obviously connected with the sliding link 155 by the bell crank lever 58, to which it is pivotally connected. The bell crank lever 58 is fastened to the transverse shaft 157, and it is upon this shaft that the locking plate is securely fastened. Thus, any motion of the sliding link will be positively communicated to this locking plate.

Upon the release of the sliding link, the parts above enumerated will quickly swing to their positions wherein the upper end of the swing link 183 will be in alignment with the adjacent ends of the selector returning racks 173 and 174, and during the actuation of the main power shaft 143 of the omni the cam lever 178 will be rocked upwardly due to the eccentricity of the cam groove 177. This upward motion of the cam lever 178 will thrust upwardly the swing link 183, the upper end of which will engage either or both of these selector returning racks 173 and 174 which may have been previously actuated to set up a selected denomination for printing and registering, and thus positively return the dollar and tens of cents selector levers and their respective mechanisms to their normal zero positions.

As the swing link 183 reaches the upper limit of its travel, its shoulder 192 will engage the downwardly projecting portion 193 of the latch member 186 and lift this member sufficiently to permit the locking plate 159 to swing into engagement with the latch member shoulder 194. This additional motion of the locking plate is also brought about by the compression spring 59*a* and will act through the drag link 162 to rock the swing link out of alignment with racks 173—174, and the locking plate, in turn, will move into position directly below the ends of these racks, as is clearly illustrated in Fig. 6. Thus, the racks will be locked in their elevated position to prevent the dollar and tens of cents selector levers from actuation.

It will be understood, however, that the machine is not locked at this point but may continue to function in all respects, with the exception of the reduced denomination which may be printed at any one operation of the machine until the machine is finally locked after the unit counter has been actuated 200 times to bring about the locking action in the manner previously described.

Resetting mechanism

It will be appreciated that a machine of this invention may be reset at any time, that is, it is not necessary to wait until the unit counter will have functioned to bring about the locking action of the machine before an additional purchase of postage may be made; in other words, the operative may take the machine to the post office and have set up therein an additional amount of postage irrespectively and independently of the unused balance remaining therein.

When using a machine of this invention, which may operate 200 times after the alarm has sounded notifying the transfer of the control from the subtracting register to the unit counter, it is natural for the operative to rely more or less upon this signal to advise when an additional amount of postage need be set up in the machine.

After the alarm has sounded the machine may be run anywhere from a few to 200 times before the operative would take the machine to the post office for resetting.

As the unit counter may be actuated any number of times up to 200, it is advisable, although not necessary, to provide a resetting means which will act automatically to reset the unit counter to zero each time a new purchase of postage is set up in the subtracting register.

When the invention is applied to a machine in which the unit counter is arranged to permit say ten impressions after the transfer of the control, and in order to make such a machine as simple as possible, the resetting means may be eliminated therefrom, in which case should the machine be operated until the signal sounded notifying the transfer of the control from the subtracting register to the unit counter, there would remain ten more impressions which could be taken from the machine, but, should the operative use only five of these impressions before having the subtracting register recharged, the unit counter would maintain therein a registration of the five impressions previously taken.

As the unit counter was not reset to zero during the resetting operation, therefore, upon the next transfer of control from the subtracting register to the unit counter, the machine could only be run five times instead of ten. This form of control is called a random locking system, and its advantage resides primarily in its simplicity.

It is to be understood, however, that this random system of locking may be used in this embodiment of the invention in which the unit counter actuates 200 times before bringing about the final locking action.

The casing **45** is provided with a door **44** having a key actuated lock **236**. This door permits access to the subtracting register and may be opened only by an authorized post office official for the purpose of setting up in the subtracting register an amount representing a purchase of postage.

As it is necessary to open the door **44** each time the register is to be reset, it is desirable to connect the means for returning or resetting the locking mechanism and denomination reducing means to the door whereby these mechanisms and means will be automatically returned to their initial positions each time the door is actuated. By so arranging these return means their operation becomes automatic and does not depend upon the person who resets the register.

The means for actuating the return of the unit counter numeral wheels to their original "0" setting may include means for rotating the sleeve **86** in a counter-clockwise direction, as viewed in Fig. 15, whereby the groove **108** thereof will engage the resetting pawls **106** of each of the unit counter numeral wheels and rotate any of these numeral wheels which may have been previously rotated back to their "0" positions.

The means for rotating the sleeve may include the sleeve pinion **87** (Figs. 12, 13, and 14) and a quadrant gear **195** meshing therewith and arranged during the resetting operation to rotate the sleeve through one complete revolution. The means for rotating the quadrant gear may include a connecting rod **196** having the forward end thereof pivotally connected to the quadrant gear, as by pivot pin **197**, and having its rear end pivotally connected to a triangular plate **198**, as by pivot pin **199**. The triangular plate **198** may be pivotally supported upon the machine frame **61**, as by means of a pivot pin **200**. This plate **198** may be oscillated by the connecting rod **201** having its upper end pivotally connected thereto by the pivot pin **199** and its lower end pivotally connected to a second triangular plate **202**, as by means of a pivot pin **203**. This second triangular plate may be pivoted to the machine frame by pivot pin **204**. The second triangular plate may in turn be operatively connected to the subtracting meter door **44** by means of the connecting rod **205** having its lower end pivotally connected to the second triangular plate **202** by means of the pivot pin **206** and to a suitable bracket **207** carried by the door **44** adjacent the hinge **208** thereof.

By this arrangement, as the door **44** is swung open, the second triangular plate will first be given a slight counter-clockwise rotation, as may be noted when comparing Figs. 8 and 10, and finally given a considerable amount of rotation in a clockwise direction, as may be noted from a comparison of Figs. 10 and 11. This rotation of the second triangular plate is transmitted through the means previously described to turn the quadrant gear through an arc to thereby cause the resetting sleeve **86** to make one full revolution. However, before rotating the resetting sleeve **86** in a counter-clockwise direction, as viewed in Fig. 15, to reset the unit counter numeral wheels, it is necessary to disconnect the Geneva transfer means from the several numeral wheels, and, therefore, means are provided for bringing about this disconnection just prior to the resetting rotation of sleeve **86**.

The Geneva disconnecting mechanism is clearly shown in Figs. 8 to 11 and may include a resetting lever or swing frame **102** pivoted at its upper end to the machine frame, as by pivot pin **209**, while adjacent the lower end of this lever the two sets of Geneva pinions **99** and **103** are freely journaled on short shaft **101**, which is in turn securely fastened to lever **102**. By means of spring **210** the lever is urged to rotate about its pivot **209** in a counter-clockwise direction, as viewed in Figs. 8 to 11, and is stopped by fixed pin **211** when the teeth of the Geneva pinions correctly mesh with the other gears and wheels of the Geneva means of the counter wheels.

A latch means **212** may be pivotally mounted to the machine frame by a suitable pin **213** and is urged to rotate in a counter-clockwise direction, as viewed in Figs. 8 to 11, by a suitable spring means **214**, whereby the notched portion **215** thereof will underlie a transversely projecting lug **216** of the resetting lever **102**, thus securely retaining the lever against its stop pin **211**, and in which position the Geneva pinions will mesh with their cooperating gears.

As it is necessary to swing the Geneva pinions clear of the Geneva gears of the counter wheels during the resetting operation, means are provided which will actuate during the initial swing of the door, that is, while the second triangular plate **202** is moving in a counter-clockwise direction to bring about this disconnection of the pinions.

Referring to Fig. 10, it will be noted that the subtracting register door **44** has been swung partially open and during this swinging of the door the triangular plate **202** has moved in counter-clockwise direction. During the rotation of the second triangular plate in the counter-clockwise direction, the connecting rod **201** will be moved for a short distance toward the right as viewed in Fig. 10, and this motion is made use of to

swing the latch means 212 clear of the resetting lever lug 216, and for this purpose the connecting rod 201 is provided with a transversely projecting pin 217 adapted to engage a short arm 218 of the latch member so as to swing this member in a clockwise direction, as viewed in Figs. 8 to 11, and as shown particularly in Fig. 10 to thereby swing the notch 215 of this latch means clear of the resetting lever lug 216.

As soon as the latch member 212 has released lug 216 the transversely projecting pin 218a carried by the arm 219 of the connecting rod 196 will engage the extending upper portion 220 of the resetting lever 102, which will bring about the rotation of this lever in a clockwise direction, as viewed in Fig. 10, to swing the Geneva pinions 99 and 103 clear of their cooperating elements.

A second latch means 221 is pivotally carried on the rocking lever shaft 72 and is yieldingly urged to rotate in a clockwise direction by a suitable spring means 222. The rotation of this second latch means 221 is limited by a suitable stop pin 223. The stop pin 223 and spring means 222 are suitably carried by a fabricated plate 224, which plate is fastened to the rocking lever 71, whereby when the rocking lever is rotated in a clockwise direction, as viewed in Fig. 10, due to the rearward motion of the sliding link 55, when this link is released during the transfer of the control from the subtracting register to the unit counter, the second latch means will be swung from its inoperative position, as illustrated in Fig. 8 to the position in which it is illustrated in Fig. 9.

It may be observed in Fig. 9 that the hooked end portion 225 of the second latch means 221 will engage the side face of a second transversely projecting lug 226 formed on the side face of the tripping lever 102, and by this engagement will prevent further rotation of the second latch means, and, therefore, its spring means 222 will become compressed as the fabricated plate 224 is rotated slightly beyond this point of contact.

It will be noted in this figure that the second latch means 221 is now spaced a short distance from its stop pin 223. The parts remain, as shown in Fig. 9, during the action of the unit counter; however, during the initial opening of door 44 to that position shown in Fig. 10, wherein by the means previously described the resetting lever 102 has been swung in counter-clockwise direction to free the Geneva pinions from their cooperating gears. The swinging motion of lever 102 will carry its lug 226 to a position whereby the hooked end portion 225 of the second latch means 221 may snap over this lug and thus retain the Geneva pinions clear of their cooperating gears.

A further opening motion of the door 44 will bring the offset portion 227 of connecting rod 201 into engagement with a transversely projecting flange 228 formed on the side face of the rocking lever 71, thus swinging this rocking lever in a counter-clockwise direction which will act not only to swing the second latch means 221 clear of lug 226 of the resetting lever 102, but will also act to return the sliding link 55 to its initial position, whereupon the trip mechanism latch 52 may hook over finger 54 of the link, thus locking the sliding link in its initial position. To prevent the resetting lever 102 from swinging the Geneva pinions into engagement with their respective gear means, a cam plate 229 is fastened to the side face of the quadrant gear 195 and the raised concentric portion 230 of this cam plate will be swung into engagement with the raised projection 231 of the resetting lever 102 and thus act to retain this lever in its depressed position.

It will be understood that the raised cam portion 230 of the cam disc will ride over the raised projection 231 just prior to the release of lug 226 by the second latch means.

The return of the sliding link 55 to its original latched position by means of the rocking lever 71 will also act through bell crank lever 58 to return the alarm mechanism to its initial position.

It is now necessary to release the main drive means of the omni as well as the clutch tripping mechanism disengaging means, and for this purpose the triangular plate 198 may be provided with a transversely projecting pin 232 adapted to engage the side arm 233 of the floating link 149 and to thereby depress this link which through a transversely projecting pin 155 will engage the upper surface of the rear end 147 of locking lever 138, and to thereby rotate the locking lever against the action of its spring 144 in a counter-clockwise direction sufficiently to permit the hooked end 136 of the depending latch lever 133 to hook over the projecting lug 137 of the locking lever 138, thus locking this lever in its initial position. By so latching the locking lever 138, the locking tongue 140 thereof will be lifted clear of the locking notch 141 of the locking wheel 142 fixed to the main drive shaft of the machine, while the rear end 147 of the locking lever through roller 150 will retain the floating link in its depressed position and to thereby re-establish the driving clutch tripping mechanism in its operation conditions.

During the return swing of the door, through the mechanism previously described, the quadrant gear 195 will be swung back to its original position. However, the return rotation of the resetting sleeve 86 caused by the return motion of the quadrant gear will not effect the setting of the numeral wheels, as the resetting pawls of the several numeral wheels will freely ride over the ratchet groove 108. However, during the return rotation of the quadrant gear 195 the cam plate 229 will be returned to its initial position and will thereby carry the raised portion 230 thereof clear of the correspondent portion 231 of the resetting lever 102, and will thus permit this lever to swing back to its initial position wherein it will engage its stop pin 211, at which point the latch 212 will again engage lever 102 to lock this lever in its operative position, wherein the Geneva pinions 99 and 103 will again mesh with their respective gear elements.

It is desirable to provide means for locking the Geneva pinions against rotation during that time in which the resetting lever 102 is swung to its depressed position, and for this purpose a stop 235 may be provided and positioned to mesh with one or more of the teeth of each of the pinions when moving out of mesh with their cooperating gears.

Operation

The general operation of the machine has been fully described in our co-pending application and need not be repeated here. However, the operation of the locking means of this invention will now be described.

Assuming the operative is treating mail requiring 13¢ postage, the tens of cents selector lever 167 will be actuated to a position opposite the value 10, while the cents lever 171 will be actu-

ated to a position opposite to numeral 3. With this setting of the selector means, each piece of mail matter passing through the machine will receive a postage indicia imprinted thereon of 13¢ denomination, and if it should so happen that mail matter bearing this value of indicia should be passing through the machine when the amount remaining in the subtracting register **35** fell below a value of $30.00, the tens of dollars wheel of the subtracting register would turn to present the numeral "2" to the window "43" of the machine, and as soon as the subtracting register came to rest the tripping lever tooth would engage the tripping notch **41** of this wheel, thus bringing about the transfer of the control of the machine from the subtracting register to the unit counter in the manner previously described.

It will be understood that each numeral wheel in the subtracting register above the tens of dollars wheel will be provided with a notch similar to the notch **41** of the tens of dollars wheel, differing only, however, in that the notch will be located in these wheels, whereby the notch will register with their respective tripping lever teeth when the numeral "0" of these wheels appears before the casing window, and it will be understood that for each numeral wheel above the tens of dollars wheel there will be provided on the tripping lever **37** a tooth similar to the tooth **40**. This structure is old and well understood by those skilled in the art and, therefore, need not be described further in detail.

It may be stated, however, that the purpose for providing each of the numeral wheels of higher order than the tens of dollars wheel with a notch and the tripping lever with a cooperating tooth is to prevent the tripping lever from actuating when the notch **41** of the tens of dollars wheel turns into registration with the tripping tooth **40**, while the numeral wheels of higher order still carry a balance, thus preventing action of the tripping mechanism until all of the numeral wheels of higher order have turned to "0".

When the value remaining in the subtracting register has been reduced below $30.00, the notch **41** of the tens of dollars wheel will register with tooth **40** of the tripping lever, and under the influence of the tripping lever spring **47** this lever will be swung in a clockwise direction, as viewed in Fig. 4, whereby the cam roller **48** carried by the lower end thereof will engage cam lever **49** and swing the releasing latch lever **52** to disengage the sliding link **55**.

The sliding link **55** will be actuated rearwardly under the influence of its spring **59a** to swing the connected bell crank lever **58** until the locking plate **159** will have swung into engagement with shoulder **191** of the latch member **186**.

This swinging motion of the locking plate through link **162** will carry the swing link **183** into alignment with the lower end of the return racks **173** and **174** of the dollar and tens of cents selector mechanisms. However, as the dollar selector lever has not been moved from its "0" position, the return rack **173** for this lever will remain in its elevated position, whereas the return rack **174** of the tens of cents selector lever will be engaged by the upper end of swing link **183** during the upward travel of this link brought about by the actuation of cam wheel **176**, cam groove **177**, cam lever **178**, and cam groove roller **181** in a manner previously described. In this way the tens of cents lever will be automatically returned to its "0" position.

As previously described, the upward motion of the swing link will cause the latch member **186** to lift sufficiently to permit the locking plate **159** to swing forwardly until it engages the shoulder **194**, and in this position the extreme upper end of locking plate **159** will directly overlie the lower ends of the selector return racks **173** and **174** and thus lock these racks against actuation, and to thereby lock the dollar and tens of cents selector levers.

The alarm **60** will be sounded simultaneously with the transfer of the control from the subtracting register to the unit counter, which will notify the operative of this change so that all other mail matter requiring 13¢ postage may be removed from the machine hopper and other mail matter placed therein, which will not require over 9½¢ postage as the cent and half cent selector levers are free to be actuated to set up any denomination within the range of the machine, which after the transfer takes place is limited from ½¢ to 9½¢. The machine may be operated 200 times, as previously described, to take care of such rush mail matter as there may be on hand.

As will be appreciated from the above description, the locking system of this invention is sturdy, reliable and flexible in its operation, and the denomination return means is likewise sturdy and positive in returning the dollars and tens of cents levers to their "0" positions, at which point these levers become securely locked.

It will also be appreciated that the operative has the advantage of a warning considerably before the machine becomes finally locked against further use and thus is enabled to in most cases take care of all of the mail matter on hand, and if not all of the mail matter at least the important pieces thereof which should go forward promptly.

The resetting of the locking, alarm and selector reducing mechanisms has been fully described, and it will be appreciated that the post office official who resets the subtracting register when an additional amount of postage has been purchased will automatically through the operation of the door cause these several means and mechanisms to be returned to their initial positions, thus insuring that the machine will always be reset correctly for a further run corresponding to the amount of postage purchased.

Modified form of unit counter

In Figs. 19 to 23, inclusive, there is illustrated a modified form of the unit counter, while in Fig. 18 this form of counter is illustrated in connection with the locking system of this invention.

The several parts of this modification which correspond to similar parts of the present embodiment of the invention will be given the same numbers with the letter "*a*" added thereto.

The principal change in this form of invention resides in the unit counter actuating pawl **70a** (Fig. 23) which is provided with three ratchet teeth **82a**, **237**, and **238** arranged in stepped relation, that is, the ratchet engaging point of tooth **82a** extends downwardly a distance slightly below the ratchet engaging end of tooth **237**, while the ratchet engaging portion of **238** is elevated above the ratchet engaging portion of tooth **237**. A ratchet wheel **93a** is suitably fastened to the side face of the units wheel **90a**, while a similar ratchet wheel **239** is fastened to the side face of the tens wheel **91a**, and to the side face of the

hundreds wheel 92a is fastened the ratchet wheel 240.

Each of the three ratchet wheels is provided with ten equally spaced teeth. When the pawl 70a is released to bring its ratchet tooth 82a into engagement with the ratchet teeth of wheel 93a, this tooth will engage the ratchet teeth of the wheel and with each oscillation of the pawl will cause the ratchet wheel 93a to make one-tenth of a revolution. Due to the stepped relation of the ratchet teeth 237 and 238, these teeth will be maintained above their respective ratchet wheels and thus only the units ratchet wheel will be turned with each oscillation of the pawl.

The operation as just described will continue until the ratchet wheel 93a will have made a revolution whereupon the deep-notched tooth 241 will turn into registration with tooth 82a of the pawl, thus permitting the pawl to swing toward the ratchet wheels to bring the ratchet tooth 237 into engagement with the teeth of its ratchet wheel 239.

As there is only a single deep notch provided in the ratchet wheel 93a, the pawl will be permitted to swing sufficiently to bring the ratchet tooth 237 into engagement with its ratchet wheel 239 only once for each revolution of the units ratchet wheel.

After the tens ratchet wheel 239 has been rotated in a manner above described for a complete revolution, its deep ratchet notch, which is similar to the deep notch 241 of the ratchet wheel 93a will be brought under the ratchet tooth 237, thus permitting the pawl to swing further toward the ratchet wheels to bring into active engagement the ratchet tooth 238 with its ratchet wheel 240, thereby bringing about the rotation of all three numeral wheels.

This form of unit counter driving pawl 70a does away with the Geneva transfer mechanism of the first-described form of the invention, and also does away with the mechanism for disconnecting the Geneva drive during the resetting operation of the unit counter, as in this embodiment of the invention the unit counter numeral wheels may be rotated during the resetting operation by their respective resetting pawls 106a through contact with the ratchet groove 108a of the sleeve 86a, as the rotation of the numeral wheels will carry the ratchet teeth freely past the respective teeth of the unit counter actuating pawl 70a.

It will be understood that each of the ratchet wheels 93a, 239, and 240 may be provided with a pawl 94a for preventing the rearward turning of the ratchet wheels and thus the numeral wheels.

The pawls 94a may be yieldingly urged into engagement with their respective ratchet wheels by a suitable spring means 96a.

The operation of this modified form of the unit counter in combination with the omni is substantially identical to the mode of operation of the unit counter previously described, and, therefore, its description will not be repeated here. This is also true with regard to the resetting operation for returning the unit counter numeral wheels to "0".

Having fully described the invention, it is to be understood that it is not to be limited to the details herein set forth, but the invention is of the full scope of the appended claims.

We claim:

1. In a locking system for a selective denomination registering machine, a register for registering in money values the selected denomination each time the machine is operated, a normally inactive control counter, means operatively responsive to the register when the amount registered therein passes a predetermined value for rendering the counter operative to count in units each operation of the machine, and a locking means operatively responsive to the control counter for locking the machine against further use when the counter has operated a predetermined number of units.

2. In a locking system for a selective denomination registering machine, a register for registering in money values the selected denomination each time the machine is operated, a normally inactive locking mechanism arranged when placed into operation to lock the machine against further use after the machine has made a predetermined number of operations after said locking means has been placed into action, and means operatively responsive to the register for rendering the locking mechanism operative when the amount registered in the register passes a predetermined value.

3. In a locking system for a selective denomination registering machine, a register for registering in money values the selected denomination each time the machine is operated, a normally inactive locking mechanism arranged when placed into operation to lock the machine against further use after the machine has made a predetermined number of operations after said locking means has been placed into action, a warning means, and means operatively responsive to the register for actuating said warning means and for rendering the locking mechanism operative when the amount registered in the register passes a predetermined value.

4. In a locking system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denomination each time the machine is operated, means for reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, a normally inactive locking mechanism arranged when placed in operation to lock the machine against further use after the machine has made a predetermined number of operations after said locking means has been placed into action, and means operatively responsive to the register when the amount registered therein passes a predetermined value for rendering the denomination reducing means and the locking mechanism operative.

5. In a locking system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denomination each time the machine is operated, means operable for reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, a normally inactive locking mechanism arranged when placed into operation to lock the machine against further use after the machine has made a predetermined number of operations after said locking means has been placed into action, means operatively responsive to the register when the amount registered therein passes a predetermined value for rendering the denomination reducing means and the locking means operative, and means for preventing the selector means from being actuated to register a value

greater than said predetermined lesser amount after said selector reducing means has functioned.

6. In a locking system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denominations each time the machine is operated, means for reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, a normally inactive locking mechanism arranged when rendered operative to lock the machine against further use after the machine has made a predetermined number of operations after said locking means has been placed into action, a warning means, and means operatively responsive to the register when the amount registered therein passes a predetermined value for actuating said warning and denomination reducing means and for rendering the locking mechanism operative.

7. In a control system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denomination each time the machine is actuated, a driving means for the machine, a mechanism positively driven by the driving means but normally retained ineffective and when released operable for positively reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, and means operatively responsive to the register when the amount registered therein passes a predetermined value for releasing said mechanism.

8. In a control system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denomination each time the machine is actuated, a driving means for the machine, a mechanism positively driven by the driving means but normally retained ineffective and when released operable for positively reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, means operatively responsive to the register when the amount registered therein passes a predetermined value for releasing said mechanism, and means for preventing the selector means from being actuated to register a value greater than said predetermined lesser amount after said selector reducing means has functioned.

9. In a locking system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denomination each time the machine is actuated, a normally inactive control counter arranged when set into operation to count in units each operation of the machine, a drive means for the machine, a mechanism driven by the drive means but normally retained ineffective and when released operable for positively reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, means operatively responsive to the register when the amount registered therein passes a predetermined value for placing the control counter into operation and releasing said mechanism, and a locking means operatively responsive to the control counter for locking the machine against further use when the counter has operated a predetermined number of units.

10. In a locking system for a selective denomination registering machine, a denomination selector means, a register for registering in money values the selected denomination each time the machine is operated, a normally inactive control counter arranged when set into operation to count in units each operation of the machine, a drive means for the machine, a mechanism operatively associated with the drive means but normally retained ineffective and when released operable for positively reducing to a predetermined lesser amount the maximum denomination which may be selected for registration during a single operation of the machine, means operatively responsive to the register when the amount registered therein passes a predetermined value for rendering the control counter operative and releasing said mechanism, means for preventing the selector means from being actuated to register a value greater than said predetermined lesser amount after said selector reducing means has functioned, and a locking means operatively responsive to the control counter for locking the machine against further use when the counter has operated a predetermined number of units.

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