

March 15, 1938.

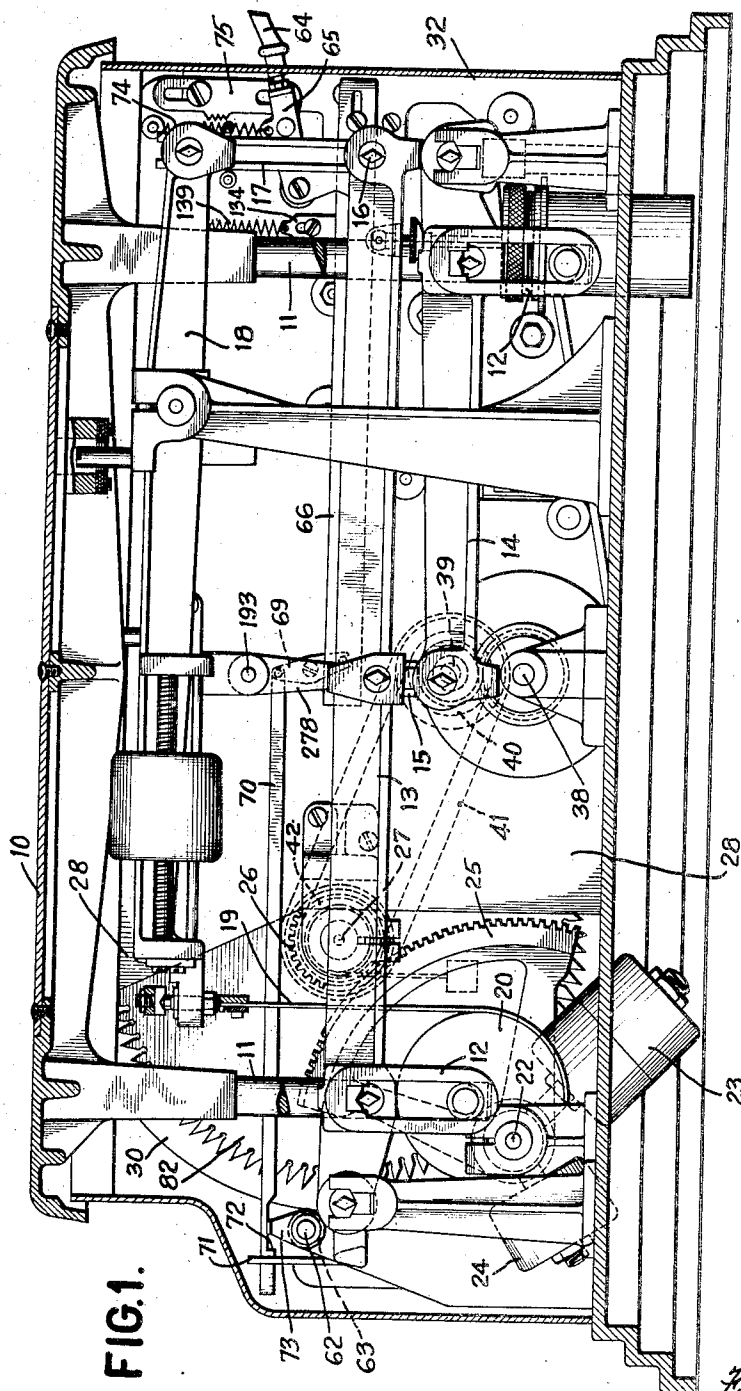
F. Q. RAST

2,111,128

PARCEL POST MACHINE

Filed July 2, 1935

8 Sheets-Sheet 1



INVENTOR
Frederick Q. Rast
BY
W. M. Wilson
ATTORNEY

March 15, 1938.

F. Q. RAST

2,111,128

PARCEL POST MACHINE

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8 Sheets-Sheet 2

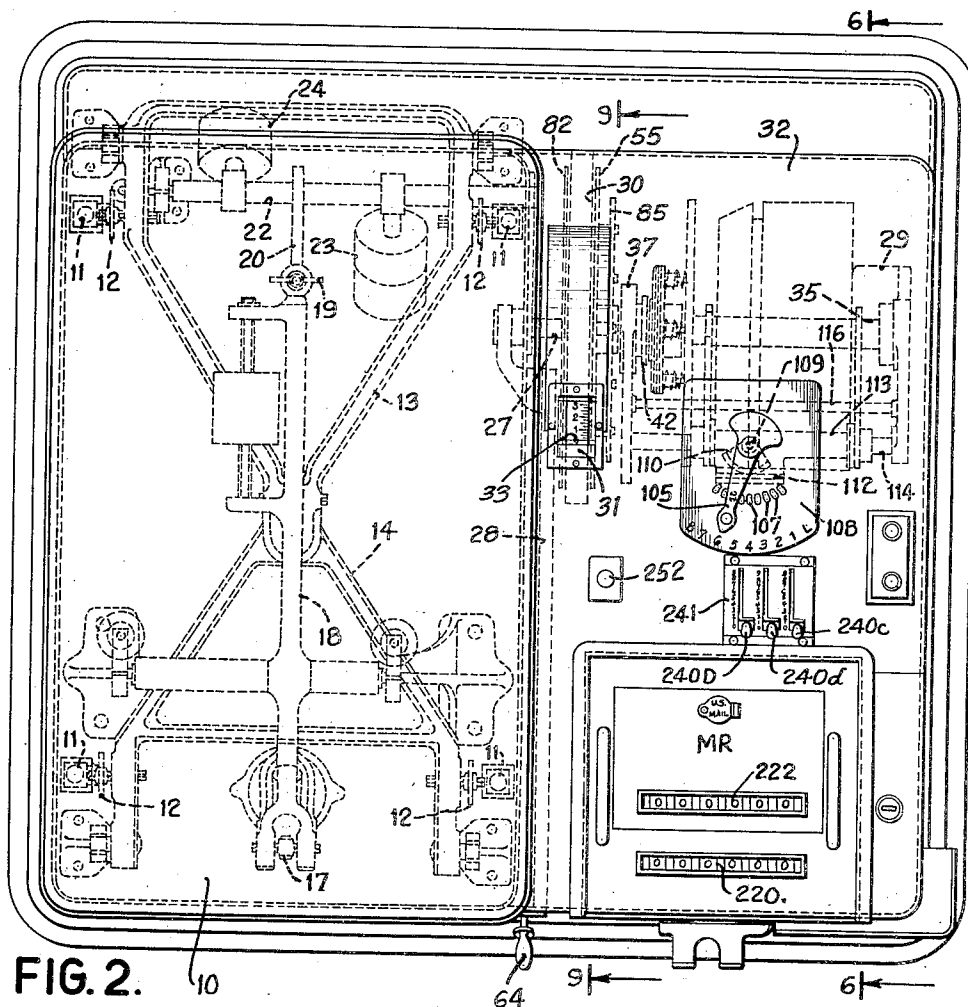


FIG. 2.

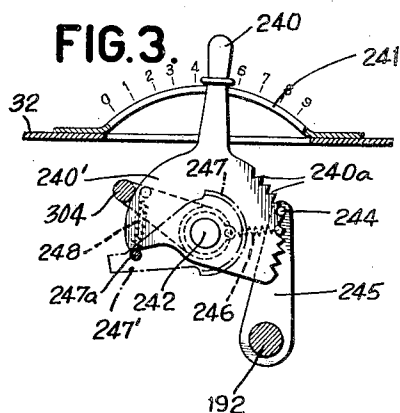


FIG. 3.

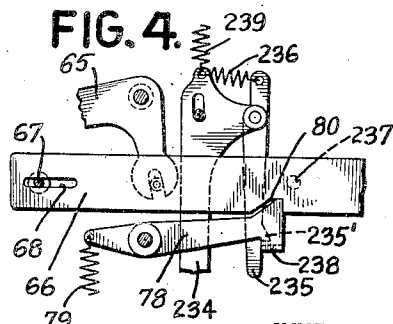


FIG. 4.

INVENTOR.
Frederick Q. Rast
 BY *W. M. Wilson*
 ATTORNEYS.

March 15, 1938.

F. Q. RAST
PARCEL POST MACHINE
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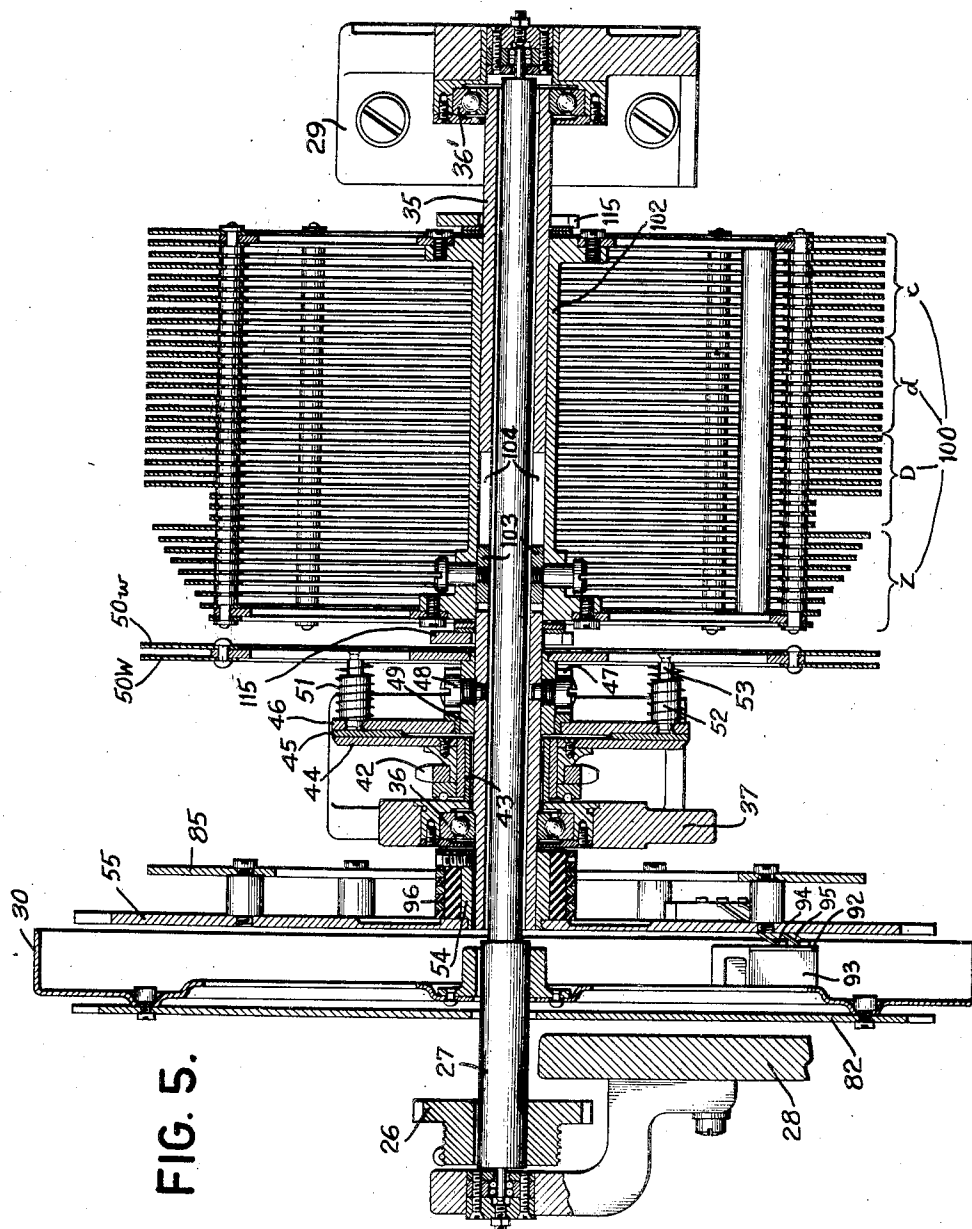


FIG. 5.

INVENTOR
Frederick Q. Rast
BY
W. W. Mahan
ATTORNEY

March 15, 1938.

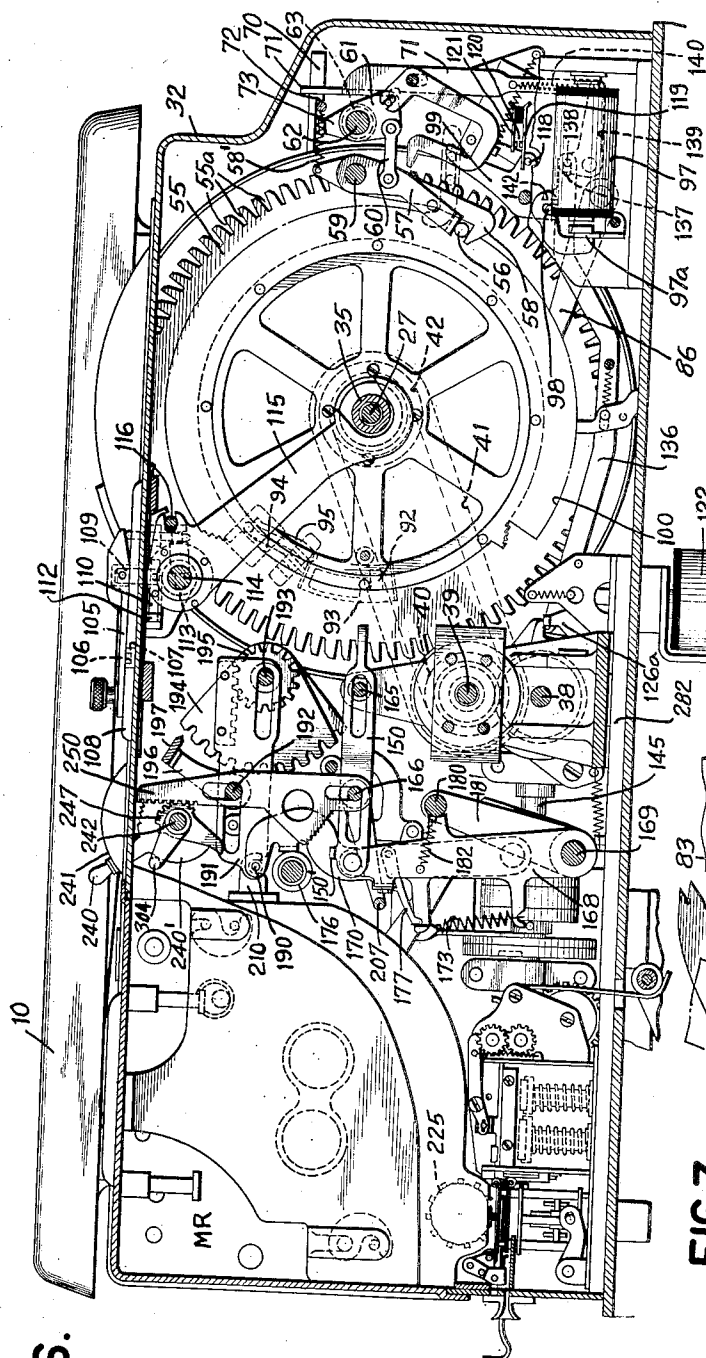
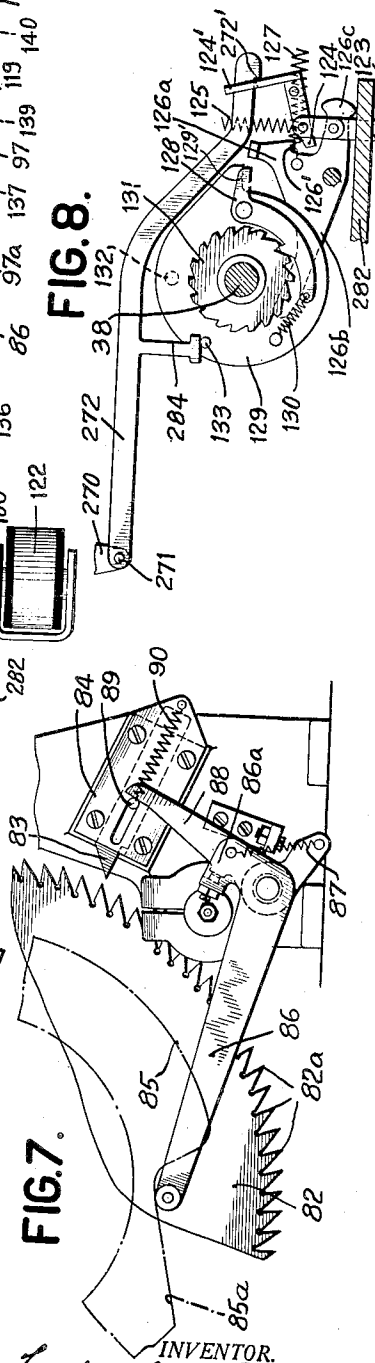
F. Q. RAST

2,111,128

PARCEL POST MACHINE

Filed July 2, 1935

8 Sheets-Sheet 4



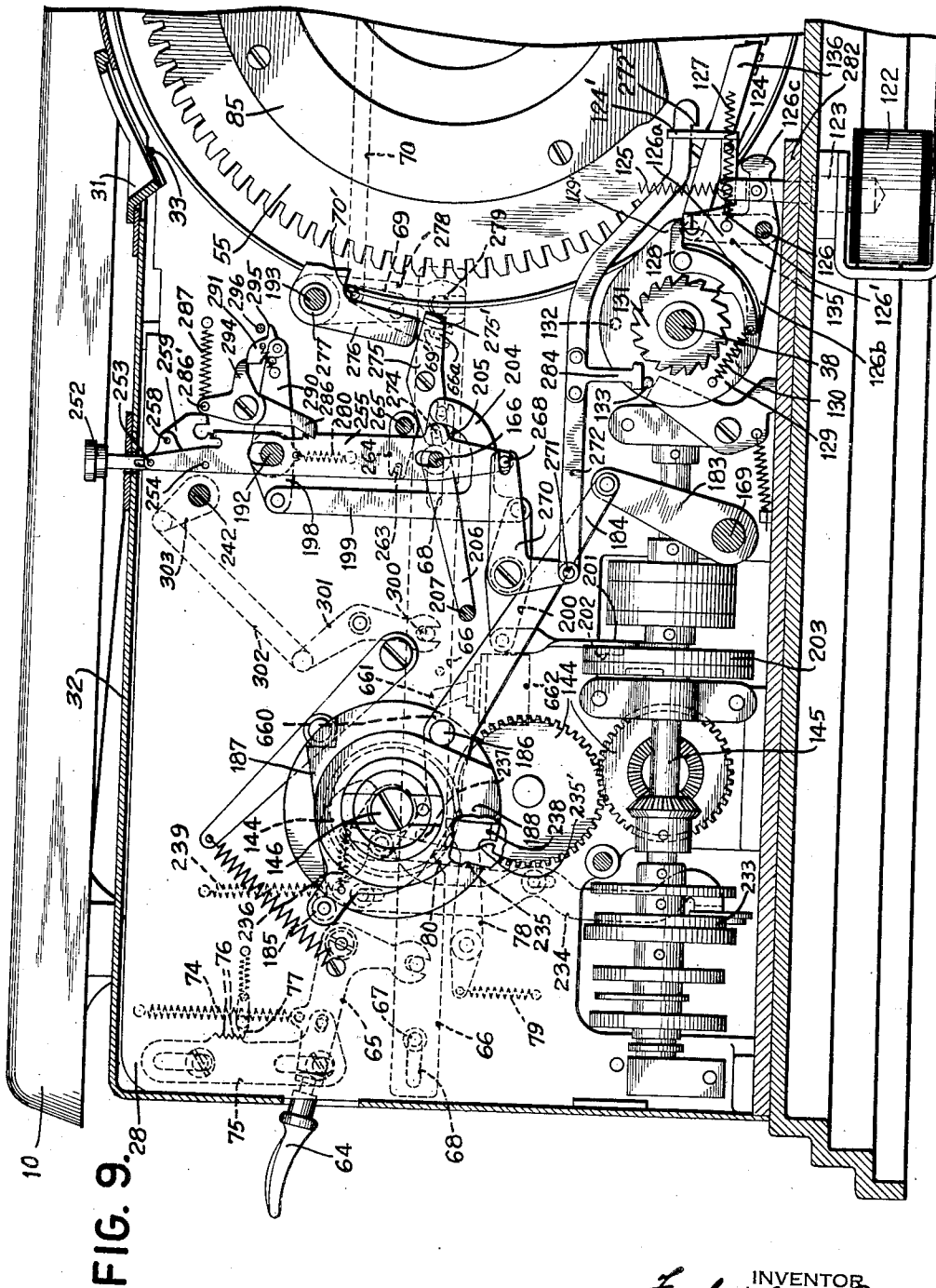
INVENTOR.
Fredrick G. Post
 BY *W. Wilson*
 ATTORNEYS.

March 15, 1938.

F. Q. RAST
PARCEL POST MACHINE
Filed July 2, 1935

2,111,128

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INVENTOR
Frederick Q. Rast
BY
Wm. M. M. M.
ATTORNEY

March 15, 1938.

F. Q. RAST

2,111,128

PARCEL POST MACHINE

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FIG. 10.

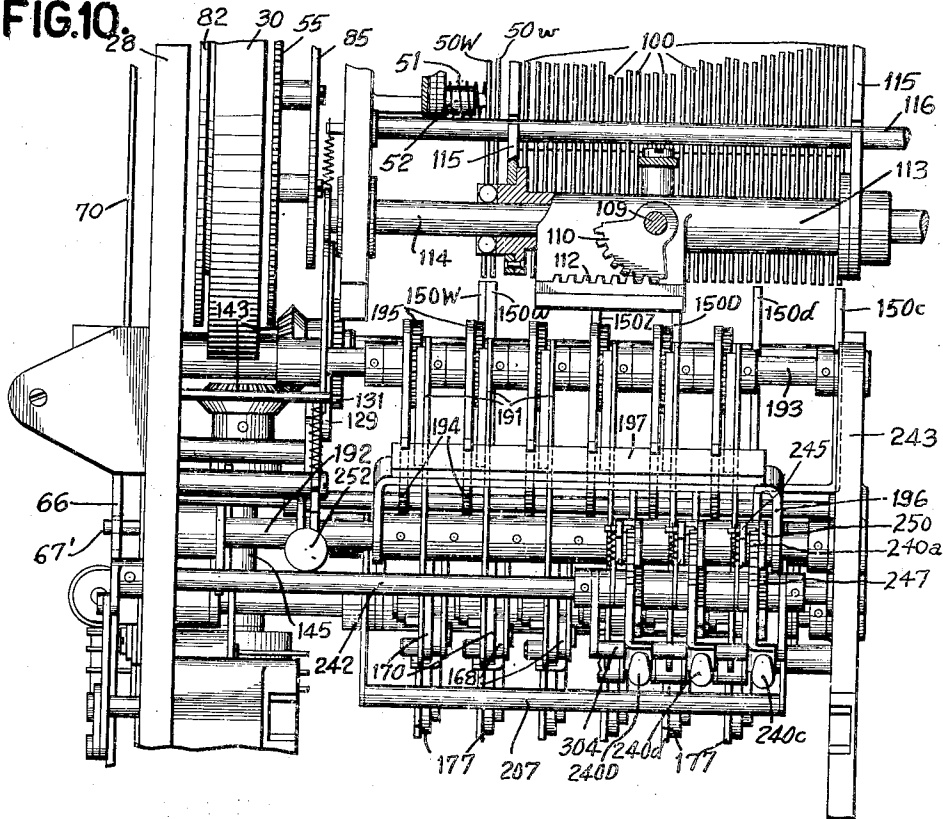
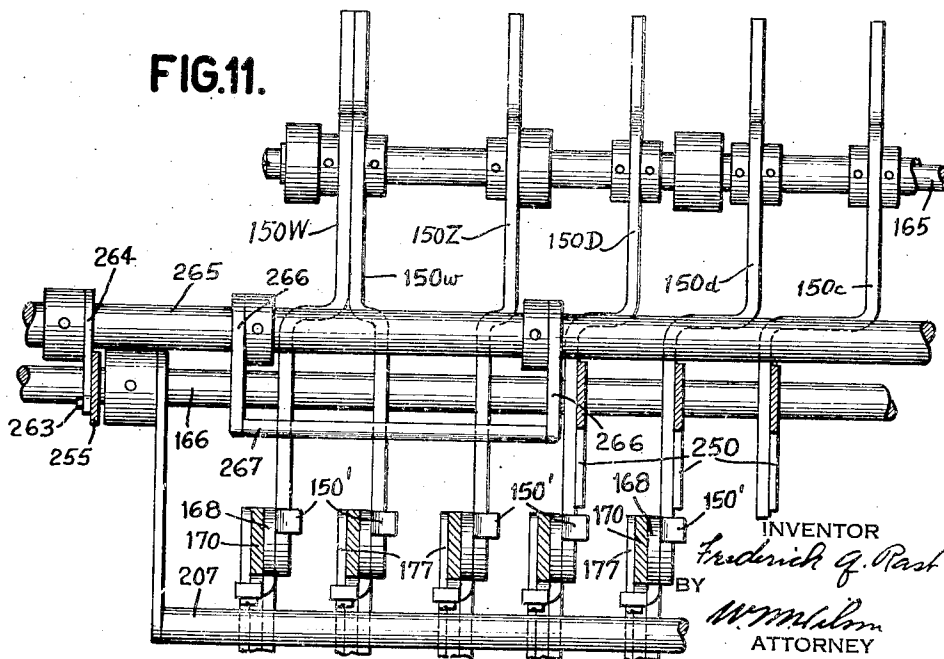


FIG. 11.



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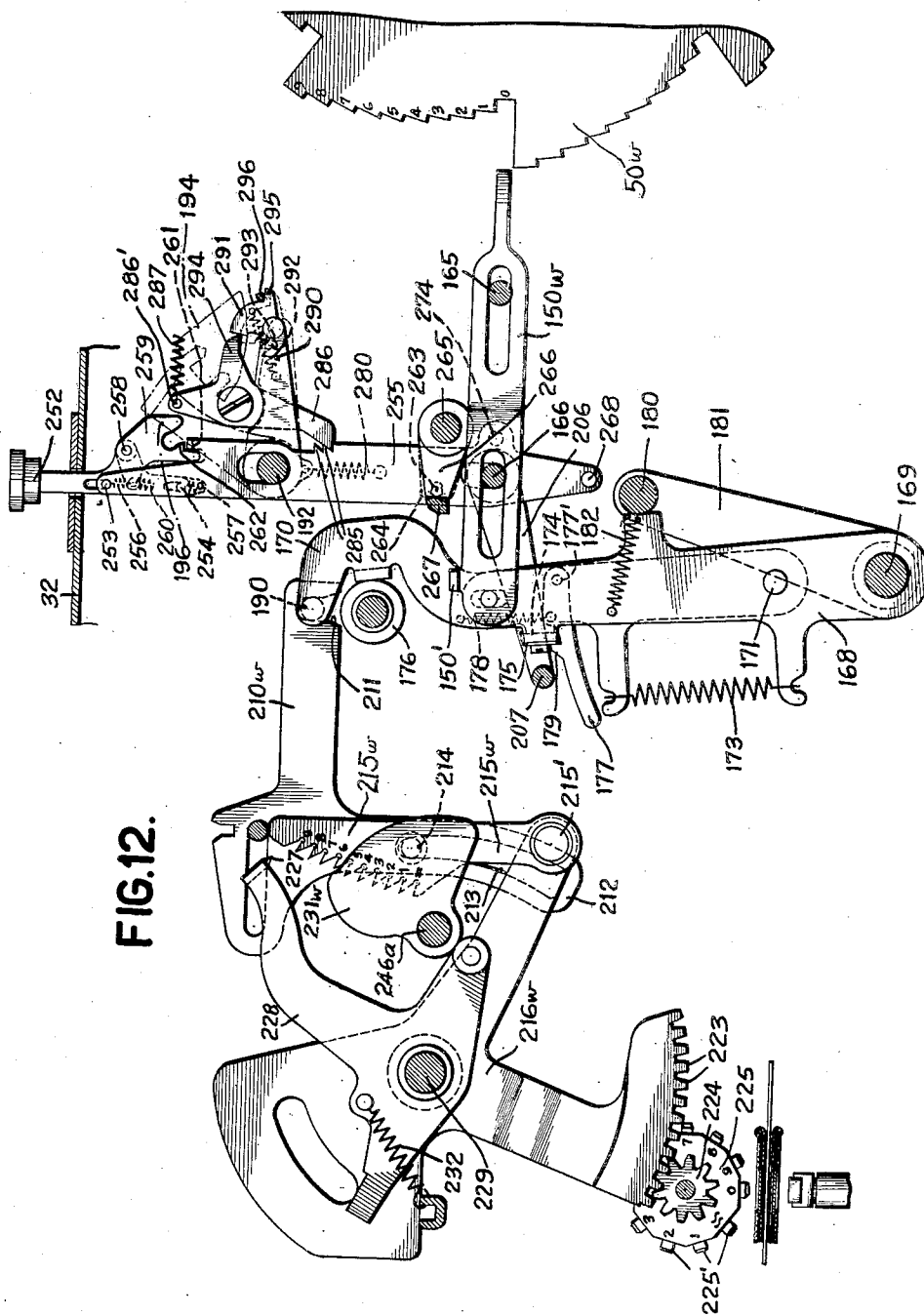


FIG. 12.

INVENTOR
Frederick H. Rast
BY
W. M. Adams
ATTORNEY

March 15, 1938.

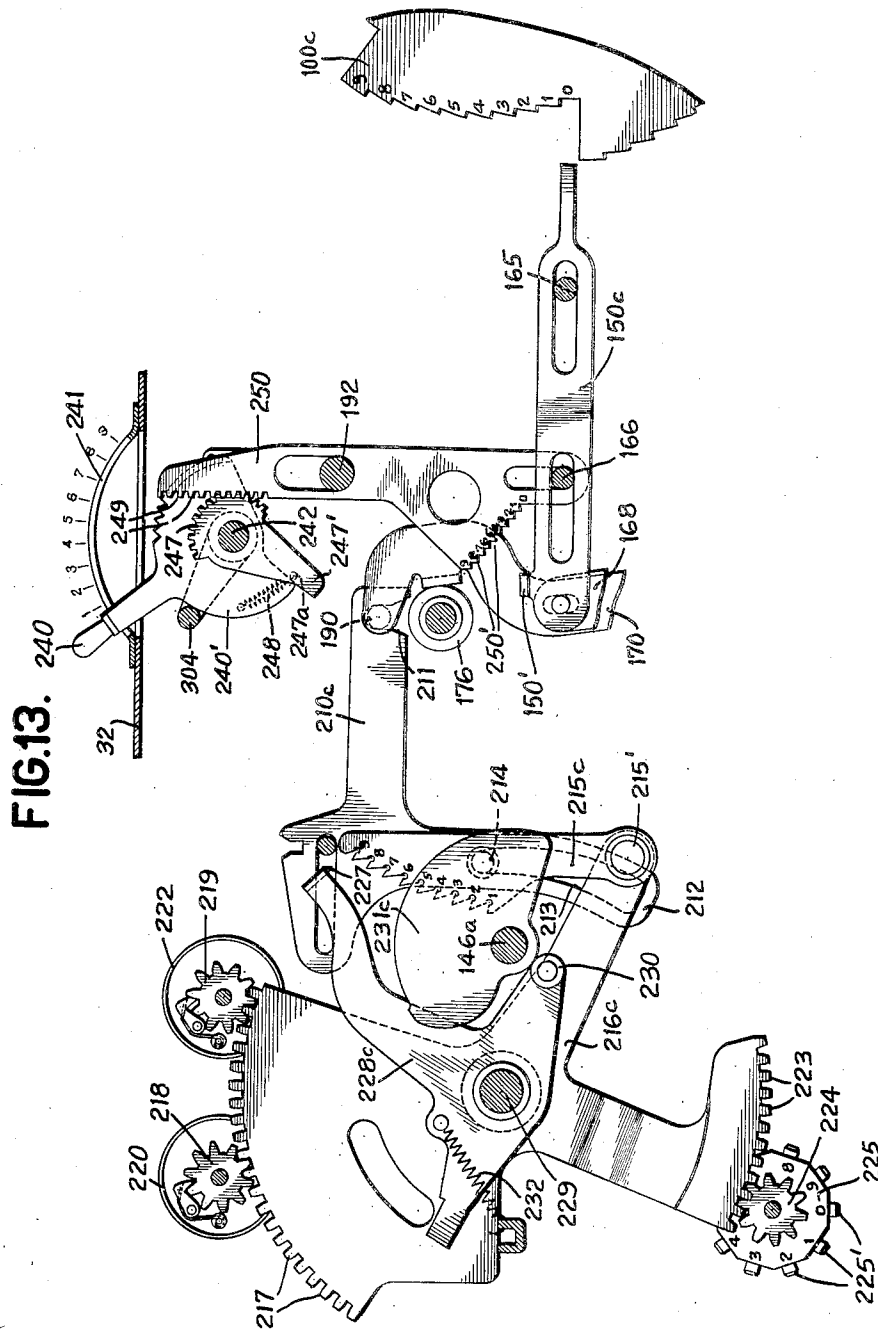
F. Q. RAST

2,111,128

PARCEL POST MACHINE

Filed July 2, 1935

8 Sheets-Sheet 8



INVENTOR
Frederick Q. Rast
BY
W. M. Wilson
ATTORNEY

UNITED STATES PATENT OFFICE

2,111,128

PARCEL POST MACHINE

Frederick Q. Rast, Binghamton, N. Y., assignor to
International Business Machines Corporation,
New York, N. Y., a corporation of New York

Application July 2, 1935, Serial No. 29,470

6 Claims. (Cl. 235—58)

This case relates to a parcel post scale.

Parcel post values depend on weight and zone. In addition to these parcel post values, it is often necessary to add the cost of insurance, registration, C. O. D., or similar service performed by the post office in connection with the package mailed by parcel post.

The general object of the present invention is to provide differentially settable means for selecting variable values supplementary to the parcel post value to be charged against the package.

The object is, further, to provide an automatic, cyclical, actuator for controlling entry of either the parcel post or the supplementary charges into a single value receiving device, such as a register.

Another object is to select either the scale controlled selector of parcel post charges or the supplementary service charge selector for controlling the register during a cycle of the actuator and for preventing any change in the selection intermediate a cycle.

Another object is also to provide a sensing finger selectively engageable with the supplementary value selector as well as with the scale-controlled value selector for determining entry operation of a value receiving device.

Still another object is to provide means for indicating absence of a scale-controlled selection of values whenever the supplementary value selector is in operation.

The above object is further to cause weight and zone type wheels to be set for printing arbitrary symbols, akin to cancellation marks, whenever the supplementary value selector is in operation.

Other objects will be presented in the following parts of the description and will appear from the drawings.

In the drawings:

Fig. 1 is a vertical, longitudinal, section through the weighing mechanism,

Fig. 2 is a plan view of the machine,

Fig. 3 is a detail section showing supplementary value selecting controls,

Fig. 4 shows a portion of the control bar for the scale value selecting mechanism in its advanced position,

Fig. 5 is a plan sectional view of the selector mechanism of the scale,

Fig. 6 is a section along line 6—6 of Fig. 2,

Fig. 7 is a detail of part of the means for locking the scale in an even pound position,

Fig. 8 is a detail of the cyclical actuator releasing means just after operation thereof under control of the supplementary selector means,

Fig. 9 is a section along line 9—9 of Fig. 2,

Fig. 10 is a plan sectional view of the portion of the machine in which the selector value reading and the value selecting means are located,

Fig. 11 is a detail of a portion of Fig. 10,

Fig. 12 is a detail view of weight or zone selecting order of elements, and

Fig. 13 is a similar view showing a postage value order of elements.

Briefly, the machine has a weighing section, a follow-up selector section, a settable selector control, a translating or reading section selectively controlled by either the follow-up selector control or the settable selector control, and a meter comprising a registering, recording section to which the reading section transmits the reading taken from the selector controls.

The package to be mailed by parcel post is applied to the weighing section to set the weighing means in a load position. The operator first sets the follow-up selector section according to the desired parcel post zone to which the package is to be mailed, then operates a control bar to cause the follow-up selector to be moved by power means towards the load position. When the selector reaches the load position, an inter-control between the selector and the weighing means acts to stop the selector and set it in load position.

The setting of the selector in load position releases an automatic power actuator for a cycle. The power actuator during this cycle sets the reading or translating means under control of the follow-up selector in differential positions which represent weight-dependent values taken from the selector. The selector has a postage cost or price division, a zone division, and a weight division. The reading mechanism reads each of these selector divisions and is set according to the weight of the package, the zone, and the cost of the postage which depends on weight and zone.

When the reading section is set in differential position, it correspondingly sets parts of a computing mechanism in the registering, recording section of the machine. The one-revolution actuator then operates other parts of the computing means in the latter section to coact with the set parts for entering the postage value into ascending and descending registers and for setting recording wheels to record the entered values on a stamp blank. At the same time, the computing means sets recording wheels to record the weight and zone on the stamp blank.

In addition to the ordinary parcel post charge, when the package is insured, registered, sent C. O. D. or when any other supplementary service is to be performed in connection with the mailing, a further charge is made. This is done by the settable selector controls which coact with the same reading, computing, registering, and one-revolution mechanisms as operated in connection with the weight-controlled selector. As a result, the registers not only enter the postage

costs taken from the weight-controlled selector but add thereto the cost of the postage value set up by the settable selector controls. In order to indicate the fact that the stamp on which the amount is printed is not for a parcel post charge, the weight and zone recording wheels are set by the operation of the settable controls to record an arbitrary, cancellation, symbol in the usual weight and zone imprint receiving locations of the stamp.

The registering, recording section is in the form of a meter. The post office initially sets the adding register to zero and the subtracting register to a positive value, then seals the meter against tampering with the registers. The user of the meter is debited with the amount set up on the subtracting or descending register. The weight-controlled selector and the settable selector govern issue of stamps by the meter and cause the descending register to subtract the amount of the postage and the adding register to add the postage amount. It is thus evident that both the parcel post values and the settable values must be entered into the same registers in order that the latter give a true account of the amount of postage used up by the machine and for which the customer has been debited or for which he has prepaid the post office.

Details of the meter, stamp issuing mechanism, and other parts of the machine not necessary to an understanding of the present invention which is concerned mainly with the selective control of the registers by the settable and weight-controlled selectors, will not be explained herein and may be obtained by referring to my copending application, Serial No. 5,026, filed February 5, 1935.

In the description or claims, the terms selector, value selecting means, or value determining means are used to define either the weight-controlled or the settable mechanism, each of which has control portions representing different values. These control portions are, in the present case, in the form of differential steps. The terms reading or translating means are employed to describe the mechanism which engages the control portions of the selectors to be differentially set thereby in differential positions equivalent to the values represented by the control portions. The reading means thus converts or translates the control portion representations into equivalent value positions.

The term computing mechanism is applied to the mechanism which coacts with the reading means according to their value positions for entering the values into the registering, recording means.

Other suitable terms may be used without restriction by above definitions.

Weighting mechanism

Referring to Figs. 1 and 2 in particular, platform 10 has legs 11, one at each corner, suspended by yokes 12 from levers 13 and 14 connected by loop 15. Nose iron 16 of lever 13 is connected through link 17 to an upper lever 18 of the first order in turn connected by tape 19 to cam hub 20 of shaft 22 below the lever.

Shaft 22 carries pendulum 23, balance-adjusting weight 24, and gear sector 25. Gear sector 25 meshes with pinion 26 on shaft 27 to turn the latter through an angle proportional to the angle through which the pendulum rocks to reach load counterbalancing position.

Shaft 27 is journaled at opposite ends in bear-

ings carried by spaced upright frame plates or standards 28 and 29 (see Fig. 5). Adjacent standard 28, shaft 27 carries cup-shaped indicating chart 30, the rim of which has weight graduations, each pound graduation being marked by weight figures. The chart is viewed through sight window 31 provided in casing 32 and is indexed by sight line 33 (Fig. 2).

As the scale is intended for parcel post weighing, its capacity is limited to 70 lbs. which is the maximum weight at present mailable by parcel post. The application of the maximum load to the scale moves shaft 27 and chart 30 through only 270° and accordingly only 270° of the rim of the chart bears weight graduations.

Selector mechanism

The selector mechanism comprises sleeve shaft 35 which surrounds but does not touch weight shaft 27. At its left end (Fig. 5), shaft 35 is journaled in bearing 36 carried by standard 37 located between standards 28 and 29. The right end of shaft 35 is journaled in bearing 36' carried by standard 29.

Shaft 35 and its parts are not moved by the force of the load but by power means which moves shaft 35 in the same direction in which shaft 27 moved in response to the load.

So far as the present invention is concerned, it is sufficient to state that the power means comprises motor driven shaft 38 geared to shaft 39 driving sprocket wheel 40 which through sprocket chain 41 drives sprocket wheel 42 (see Figs. 5, 6). Sprocket wheel 42 is slidably and rotatably mounted on collar 43 surrounding but not touching sleeve shaft 35 and rigidly extending from one side of bearing 36 of shaft 35. Rigidly connected to sprocket wheel 42 is friction clutch disk 44 cooperating with friction ring 45 loosely centered on a circular shoulder of friction clutch disk 46.

The hub of disk 46 has axially extending slots 47 coacting with the heads of screws 48 to slidably key the disk to collar 49 fastened to shaft 35 by screws 48. Carried by collar 49 are tens of lbs. stepped selector disk 50W and units of lbs. stepped selector disk 50w. Between disks 50W and 46 are coil springs 51 surrounding sockets 52 which extend from disk 46 and slidably receive pins 53 secured to disk 50W. The pressure of springs 51 urges friction coupling elements 44, 45, and 46 to maintain firm, constant engagement.

Normally, shaft 35 is in home position and restrained from being driven by clutch disk 44. To hold shaft 35 in home position, it has a collar 54 at the left end (Fig. 5) to carry toothed disk 55 having pin 56 projecting from its side (Fig. 6). This pin is engaged at one side by pivoted stop 57 and at the opposite side by rebound latch 58. With detent 57 engaging pin 56, rotation of disk 55 and its shaft 35 in the direction in which the power drive tends to move the shaft (counterclockwise, Fig. 6) is prevented.

Detent 57 is freely pivoted on shaft 59 and connected by link 60 to plate 61 rigidly dependent from shaft 62. Coil spring 63 (see also Fig. 1) surrounding shaft 62 urges it clockwise to cause plate 61 and link 60 to hold detent 57 in the path of pin 56.

After the weighing mechanism comes to rest under a load, the operator depresses handle 64 (Figs. 1, 9) provided at the end of the horizontal arm of bell crank lever 65 pivoted to frame plate 28. The vertical arm of lever 65 is pivotally connected to horizontal control bar 66 slidably

mounted at the left side of frame plate 28 (Fig. 10) by means of pins 67 and 67' extending from the frame plate through horizontal slots 68 of bar 66. Intermediate its ends, bar 66 has a stud 660 for engaging the lever 661 of a toggle switch 662. When bar 66 is advanced, stud 660 closes switch 662. The purpose of this switch, as will be later brought out, is to partially close a circuit for controlling operation of a cyclical actuator.

At its right end (as viewed in Fig. 9), bar 66 is pivotally connected to the lower arm of lever 69 by means of a pin 66a on the bar coacting with a slot 69' in the lower end of said lever. The upper arm of lever 69 is pivotally connected by a pin 70' to the left end of horizontal bar 70. The right end of bar 70 passes through a slot at the upper end of vertical bar 71 (Figs. 1, 6) and is thereby guided for horizontal slidable movement. Adjacent its right end, bar 70 is undercut to provide a shoulder 72 which is engageable with the upper end of upright arm 73 rigidly extending from shaft 62.

When the operator depresses handle 64, lever 65 rocks counterclockwise (Fig. 9) against resistance of spring 74 and moves control bar 66 to the right. To ensure a full stroke movement of these parts, lever 65 is connected to vertically slidable plate 75 having teeth 76 coacting with full stroke pawl 77 to prevent return movement of lever 65 before it has been moved completely through its forward stroke.

When bar 66 is moved forward, latch pawl 78 pivoted to frame plate 28 is moved by spring 79 into notch 80 in the bottom of bar 66 and locks the bar in its forward, actuated, position (as shown in Fig. 4). As bar 66 moves forward, through link 69, it moves bar 70 to the left (Figs. 6 and 9) causing shoulder 72 on the latter bar to engage arm 73 and rock shaft 62 counterclockwise. Through plate 61 and link 60, this movement of shaft 62 withdraws detent 57 from pin 56. Disk 55 and its shaft 35 are thereby released for counterclockwise rotation (Fig. 6) by friction coupling 44-45-46.

Rotation of shaft 35 is arrested when it reaches a position corresponding to the load position of weight shaft 27. Parcel postage is charged on the basis of the even pound weight of the package and accordingly shaft 35 must be set according to an even pound load. Before this can be done, weight shaft 27 must be given a secondary setting to place it in even pound position. For this reason, weight chart 30 rigidly carries notched disk 82 (Figs. 1, 2, 5, 7), notches 82a of which are pound distances apart. Knife edge 83 (Fig. 7) is slidably mounted in guide bracket 84 for movement radially of disk 82. The knife edge is shaped similarly to notches 82a and as it moves into a notch, it cammingly coacts with the inclined side of the notch to move disk 82 in a forward, weighing direction, (counterclockwise, as viewed in Fig. 7 and clockwise, as viewed in Fig. 1). When the knife edge is fully seated in a notch 82a, it locks disk 82 in even pound position and accordingly weight shaft 27 and chart 30 are set in even pound position.

Knife edge 83 is moved towards disk 82 under control of cam disk 85 (see particularly Figs. 5, 7) which is fastened to notched disk 55. When shaft 35 is released for rotation by its friction drive, the initial angle of its rotation before it can reach the zero load position of shaft 27 causes cam rise 85a of cam 85 to rock lever 86 counterclockwise. Lever 86 has a short, rear, arm 86a connected by spring 87 to the tail of lever 88, the upper end of which abuts pin 89 extending from

the side of knife edge 83 through an elongated slot in the side of bracket 84. Also connected to this pin 89 is a spring 90. When lever 86 rocks counterclockwise, through spring 87 it causes lever 88 to follow and move knife edge 83 against resistance of spring 90 into a notch 82a. Spring 87 is stiffer than spring 90 so that it does not give until the knife edge is fully seated in notch 82a. Weight shaft 27 and its parts are thus locked in even pound position.

To arrest shaft 35 in this even pound load position, an electrical intercontrol is provided between weight shaft 27 and shaft 35. This intercontrol comprises contact plate 92 (Figs. 5, 6) set in bakelite block 93 secured to the base of chart 30. Contact plate 92 moves with chart 30 and therefore when the latter is set in a load position, the contact plate is likewise in a position corresponding to the load. For sensing the position of plate 92, notched disk 55 carries a pair of brushes 94 and 95. In home positions of contact plate 92 and brushes 94 and 95, the plate is in front of the brushes by an angle of about 45°. The maximum angle of movement of the chart and, therefore, of plate 92, under a load of 70 lbs., brings the plate to the rear of but still out of contact with the brushes. Thus, during the weighing operation, brushes 94, 95 do not touch contact plate 92 and therefore the supplementary, selector mechanism has no reaction on the weighing mechanism and no effect on the accuracy of the weighing operation.

Shaft 35 is behind zero load position by the angular distance which brushes 94, 95 are to the rear of contact plate 92 when all these parts are in initial positions. After plate 92 is set by the load, rotation of shaft 35 is initiated and its cam 85 operates levers 86 and 88 to cause knife edge 83 to lock disk 82 and thereby to set contact plate 92 in even pound position. This action is completed before shaft 35 reaches zero load position. As rotation of shaft 35 continues, brushes 94, 95 reach zero load position and then move through the angle previously covered by contact plate 92 before engaging the plate. When the brushes reach plate 92, shaft 35 and its parts are in even pound load position.

Brushes 94 and 95 are suitably connected through commutator 96 (Fig. 5) on collar 54 of shaft 35, into a control circuit and are serially arranged in the circuit which is open because of the normal gap between the brushes. When the brushes reach the load position, they engage contact plate 92 and are serially, conductively, connected to close the gap in the control circuit. As a result, the circuit is completed and energizes latch magnet 97 (Fig. 6). Energization of magnet 97 rocks its armature 97a clockwise. The upper end of the armature is slotted to receive pin 98 on the lower end of pivoted latch 99, the nose of which is shaped to fit into a notch 55a of notched disk 55. The latch is weighted to normally hold it in clockwise position (Fig. 6).

Notches 55a are spaced pound distances apart correspondingly to the spacing of notches 82a of weight-operated disk 82. When magnet 97 is energized, it rocks its armature clockwise (Fig. 6) which acts on pin 98 to rock latch 99 counterclockwise and move the latch nose into a notch 55a. As a result, disk 55 and its shaft 35 are arrested in load position corresponding to that of weight shaft 27.

The load setting of sleeve shaft 35 is for the purpose of setting selector disks, carried by the shaft, in load proportional positions. The selec-

tor disks comprise in addition to stepped tens and units pounds disks 50W and w, the thirty-six disks 100 (see Figs. 5, 10). Disks 100 include four distinct sets of disks, each set having nine disks, one for each of the present parcel post zones 0, 1, 2, 3—8. Reading from left to right in Fig. 5, the first set consists of nine zone disks 100Z; the second set consists of dollar value disks 100D; the third set, of dimes value disks 100d; and the fourth, of cents value disks 100c. The different disks 100Z, D, d, and c having the same order in their respective sets relate to the same zone. Thus, the second disk from the left, Fig. 5, of each of sets 100Z, D, d, and c all relate to zone 1.

Disks 100 are carried by a tubular shaft 102 slidably keyed to shaft 35 by blocks 103 movable along slots 104 of shaft 35.

Knowing the zone to which a package is to be mailed, the operator before he depresses handle 64, makes a zone selection of disks 100Z, D, d, and c. To make the zone selection, the operator first raises handle 105 (Figs. 2, 6) to release pin 106 of the handle from notch 107 in plate 108 extending along the top of main casing 32. There are nine notches 107, one for each zone, each denoted by a zone figure marked on plate 108 in proximity to the rear and pointed, index, end of handle 105.

Notches 107 are arranged concentrically of vertical shaft 109. Handle 105 is pinned to shaft 109 in a manner to permit vertical rocking of the handle. Shaft 109 has gear sector 110 (Figs. 6, 10) meshed with rack 112 rigidly secured to sleeve 113 slidable along shaft 114. Fixed to the opposite sides of sleeve 113 are arms 115, the upper portions of which have slots riding along rod 116, thereby preventing rotational movement of arms 115 and sleeve 113. Arms 115 extend downwardly to shaft 35 and are forked at their lower ends to straddle but not touch shaft 35. The arms contact opposite sides of tubular shaft 102 which carries stepped disks 100.

After handle 105 is raised to release its pin 106 from a notch 107 in plate 108, the handle is rocked horizontally till its index end points to the desired zone figure on the plate. As the handle rocks, it turns shaft 109 which through gears 110 and 112 slides sleeve 113 and arms 115 along rods 114 and 116. The arms 115 in turn slide tubular shaft 102 along shaft 35 to place the disks 100D, d, c, and Z corresponding to the selected zone in control positions. When the index end of handle 105 points to the desired zone figure on plate 108, the handle is released to drop its pin 106 into the corresponding zone notch 107 and hold handle 105 against accidental shifting. The zone selection is then complete.

Since the maximum load angle covered by shaft 27 and, consequently, shaft 35 is 270°, only 270° of the periphery of each of selector disks 50W, w, 100Z, D, d, and c is needed to effect control operations. This portion of the periphery of each selector disk is formed with steps of different radial heights to represent the different values in the order to which the disk relates.

To represent values 9, 8,—1, 0, the steps of value disks 100D, d, and c uniformly decrease in radii by equal differential distances, as indicated in Fig. 13. The steps of the weight selector disks differ from the steps of the value disks only in that the distance between the 1 and 0 steps is twice the differential distance between any other successive pair of steps (see Fig. 12). The zone disks for 270° of their periphery are arcuate since the zone value is the same for all loads. These

arcuate portions of the zone disks differ in radii to represent values 0, 1—8 and each such radius is the same as the radius of a weight selector disk step having like value. For example, the zone disk of the eighth zone has its control arc along a radius equal to that of an 8 step of a weight selector disk 50 and following the plan of the latter disk, the difference in radii between the 0 or local zone disk and the 1 zone disk is twice the difference between any other pair of zone disks. For convenience, the 270° control arc of a zone disk may hereinafter be spoken of as a zone step.

The selector disks control printing and registering means for operation according to the values represented by the steps in control positions. To translate the step differentials into equivalent entry operations of the registering and printing means, mechanism is provided to sense or read the disks. For operating the reading mechanism, a one-revolution actuator is provided.

One-revolution actuator

The operation of the one revolution actuator is initiated by the locking of disk 55 and its shaft 35 in load position. Latch 99 which locks disk 55 in load position has a stud 118 (Fig. 6) extending from one side thereof and located beneath lower spring blade 119 carrying one of the points of contact switch 120, the other of which is carried by upper blade 121. When latch 99 rocks counterclockwise to lock disk 55, stud 118 moves blade 119 upwardly to close switch 120.

Switch 120 is in the circuit of clutch solenoid 122 (Figs. 6, 9). In series with switch 120, in this circuit, is switch 662 previously closed by advance of control bar 66, as explained before. When switch 662 was closed, it prepared the circuit for completion by closing of switch 120. Now, with switch 120 closed by arrest of disk 55 in load position, the circuit is established and energizes clutch solenoid 122.

Energization of solenoid 122 lowers its core 123 to release pivoted latch 124, against resistance of spring 125 from detent arm 126a which is fixed to shaft 126. Spring 127 thereupon rocks shaft 126 clockwise (Fig. 9) to release detent arm 126a from the tail of clutch pawl 128 pivotally carried by driven disk 129. Spring 130 then rocks the tooth of pawl 128 into driving engagement with the teeth of ratchet disk 131 which is rigidly carried by continuously rotating, motor driven shaft 38. Disk 129 is thereby coupled to shaft 38 for clockwise rotation (Fig. 9).

Disk 129 has two angularly spaced studs 132 and 133. At 180° of the revolution of disk 129, stud 132 engages horizontal arm 126b integral with arm 126a to rock shaft 126 counterclockwise (Fig. 9), thereby placing arm 126a in position to intercept clutch pawl 128. Extending oppositely to arm 126b is another horizontal and integral arm 126c which, when shaft 126 rocks counterclockwise, positively kicks latch 124 upwardly into position for holding arm 126a in declutching position, shown in Fig. 9. Before stud 132 rides off arm 126b, the following stud 133 engages the arm to continue to hold it in counterclockwise position.

Rigidly carried by shaft 126 is upright arm 135 pivotally connected to the left end (Figs. 6, 9) of horizontally extending rod 136. As shown in Fig. 6, the right end of rod 136 is formed with horizontal slot 137 receiving pin 138 at the upper end of bell crank 139 which is connected to the lower end of vertical bar 71. Spring 140 con-

nected to bar 71 yieldingly holds the latter bar in lower position in which bar 70 guided thereby is effective to engage its shoulder 72 with arm 73. In the lower position of bar 71, bell crank 139 is held in clockwise position with its pin 139 engaged with the right end of slot 137 of bar 136.

Bar 136 also has an upright lug 142 projecting from its upper edge and facing pin 98 of latch 99.

Fig. 6 shows the normal, initial, relationship between lug 142 and pin 98 and between slot 137 and pin 138. When shaft 126 is then rocked clockwise to initiate the one-revolution cycle of disk 129, bar 136 is moved to the right. At 180° of the cycle, pin 132 on disk 129 acts on arm 126b to return shaft 126 to normal position. This in turn causes rod 136 to move to the left, back to normal position in which its parts bear the initial relationship to pins 98 and 138 except that pin 98 is now further to the right because of the actuated position of latch 99.

Studs 132 and 133 not only return shaft 126 and bar 136 to initial positions but coact with arm 126b to move bar 136 beyond the latter positions causing lug 142 and the right hand wall of slot 137 to respectively move pins 98 and 138 to the left.

Movement of pin 98 to the left causes clockwise rocking of latch 99 (Fig. 6) to disengage the nose of the latch from disk 55. Movement of pin 138 to the left rocks bell crank 139 to raise vertical rod 71 which in turn raises bar 70 to release shoulder 72 from arm 73 of shaft 62. Spring 63, about shaft 62, thereupon rocks shaft 62 clockwise to replace detent 57 in initial position for intercepting pin 56 of disk 55. Since latch 99 has released disk 55, friction drive 44-45-46 resumes counterclockwise rotation of shaft 35. When pin 56 reaches the nose of rebound latch 58, it cams the latch aside and then engages detent 57 which arrests disk 55 and shaft 35 in home position. As pin 56 passed the nose of latch 58, spring 58' connected to the latch moved the nose behind pin 56 to prevent rebound of disk 55.

When latch 99 moved clockwise to free disk 55, stud 118 of the latch released blade 119 for return to initial, lower position, causing switch 120 to open and break the circuit through solenoid 122. As a result, latch 124 controlled by solenoid 122 remains in upper position to continue to hold detent arm 126a in its declutching position after stud 133 of disk 129 ceases to act on arm 126b.

Stud 133 releases arm 126b at about 270° of the cycle. Before then, however, disk 55 has been released by latch 99, detent 57 has been returned to stop position, and solenoid 122 has been deenergized so that latch 124 is in upper position. When clutch pawl 128 has made a single revolution, arm 126a engages the tail of the pawl and rocks its tooth out of engagement with ratchet disk 131, thus uncoupling disk 129 from driving shaft 38. Arm 126a also engages ledge 123' of disk 129 to stop the disk in definite home position.

As indicated in Fig. 10, disk 129 is geared one-to-one by bevel gearing 143 to horizontally extending cam shaft 145 which in turn is geared one-to-one by gearing 144 (Fig. 9) to cam shaft 146 journaled in frame plate 28.

Reading mechanism

For convenience, elements related to the different orders of selector disks, 50W, w, 100D, d, c,

and Z may be denoted by suffixing a common reference character by the disk suffix W, w, Z, D, d, or c. Thus, elements related to disk 50W may have their reference character followed by W; those related to disk 100c, by suffix c; and so on.

The disk reading means comprises six sensing fingers 150 which, from left to right in Fig. 10, are 150-W, w, Z, D, d, and c. These fingers, by their locations, determine the control planes of the selector disks. Selector disks 50W and w are permanently set relative to shaft 35 in their control planes. Disks 100 are shiftable along shaft 35 by the previously described zone selection, to set one disk 100Z, one disk 100D, one disk 100d, and a disk 100c in their respective control planes.

Referring to Figs. 6, 12, and 13 the six reading fingers 150 are commonly mounted for horizontal slidable movement by rod 165 and shaft 166. The rear end of each finger is pivotally connected to the upper end of one of six arms 168 rotatably mounted at their lower ends on common shaft 169 (Figs. 6 and 12). Each arm 168 has a companion, paired, arm 170 pivotally carried at the lower end by stud 171 extending from the side of carrier arm 168. Spring 173 connects the paired arms and tends to rock arm 170 to the rear to engage lug 174 on the latter arm with lug 175 on its companion arm 168. In the initial positions of the paired arms, the rear of arm 170 is engaged with rubber-covered rod 176 which prevents spring 173 from moving arm 170 sufficiently to the rear to engage its lug 174 with lug 175 of arm 168. As a result, lug 174 is then slightly in advance of lug 175. In this initial position of the parts, latch 177 pivoted at 177' to arm 170 and urged clockwise by spring 179 has its tooth 179 engaged with the bottom of lug 175, as indicated in Fig. 6.

The initial, retracted, position of arms 168 is determined by their engagement with cross rod 180 carried by bail arms 181 secured to shaft 169. Each arm 168 is individually connected to rod 180 by spring 182. In their retracted positions, arms 168 hold sensing fingers 150 slightly outside the path of rotation of the outermost points of the selector disks so as not to hinder the load setting of the disks.

Fixed to the end of shaft 169, adjacent frame 28, is crank arm 183 (Fig. 9) pivotally connected to the lower end of link 184 having a hook-shaped portion at the upper end, the bight of which slidably receives shaft 166 and is guided thereby for vertical, inclined, movement.

Link 184 has a follower pin 185 at its upper end and a follower pin 186 intermediate its ends respectively engaging the peripheries of complementary cams 187 and 188 fast to cam shaft 189. The load setting of the selector disks initiates the one-revolution cycle of shaft 189.

During the first thirty degrees of the cycle, cam 188 positively moves link 184 downwardly to rock shaft 169 clockwise, causing rod 180 to move arms 168, through springs 182, in the same direction. Movement of arms 168 does not impart movement to paired arms 170 until fingers 150 have reached the locus of the outer or "9" value steps of the selector disks. At this point, lug 175 of arm 168 engages lug 174 of paired arm 170 and nose 179 of latch 177 moves behind lug 174. The relative position of the parts is then as indicated in Fig. 12 and arms 168 and 170 are now coupled for common forward movement. When finger 150 engages a step of the selector disk,

forward movement of the connected arms 168 and 170 stops. Spring 182 between the arrested arm 168 and rod 180 then stretches to permit rod 180 to continue its forward stroke.

- 5 At the end of the forward stroke of rod 180, all six pairs of arms 168 and 170 will be set in differential positions determined by the steps of the selector disks engaged by fingers 150.

- Referring to Fig. 6, each arm 170 is connected at its upper end by pin 190 to rack bar 191 guided by cross shaft 192 and rod 193. Rotatably carried by rod 193 are six notched sectors 194 each rigidly provided with a pinion 195 meshed with one of the rack bars 191. The forward movement of an arm 170 will cause its pin 190 to move rack bar 191 to the right which through pinion 195 turns sector 194 clockwise.

- Carried by shaft 192 is a bail 196 having lock bar 197 extending across all six sectors 194. Referring to Fig. 9, shaft 192 has crank arm 198 connected to vertical link 199 pivoted to one end of lever 200, the other end of which is connected to vertically slidable link 201 having a follower 202 engaging the internal groove of box cam 203 on cam shaft 145.

- After rod 180 has finished its forward stroke, cam 203 depresses link 201 to rock lever 200 counterclockwise. This action of lever 200 raises vertical link 199 to rock arm 198 and its shaft 192 clockwise, as a result of which lock bar 197 (Fig. 6) moves into aligned notches of sectors 194 to lock the sectors in their differential actuated positions. With sectors 194 locked, pins 190 on the upper ends of arms 170 are also locked in their differential positions.

- Further, when link 199 moves upwardly, an extension 204 thereof (Fig. 9) rocks arm 205 fast to shaft 166 counterclockwise. As indicated in Figs. 6, 10, 12, shaft 166 carries bail 206 having cross rod 207 located above latches 177. When shaft 166 rocks counterclockwise, rod 207 descends and depresses latches 177 to release their teeth 179 from lugs 175 of arms 168, thus freeing the latter arms for return movement.

- Between 55° and 95° of the cycle, cam 187 on shaft 146 coacts with roller 185 of link 184 to positively retract the link, causing restoration of shaft 169 and bail rod 180. During return of rod 180, it engages arms 168 and positively restores them and connected sensing fingers 150 to initial positions. As arms 168 return, their paired arms 170 pivot about their locked pins 190 and springs 173 stretch to store up energy for returning arms 170 to initial position when pins 190 are subsequently released.

- With fingers 150 withdrawn from selector disks 50 and 100, the disks are free to be returned to home position in the manner previously explained. Pins 190, however, which have been differentially set under control of the selector disks remain locked in their set positions.

Registering and printing means

- The registering, printing means are in meter MR (Fig. 2). The registering means registers amounts taken off the value selector disks 100D, d, c. The printing means is adapted to print the weight and zone taken off selector disks 50W, w, 100Z. Meter MR has six slides 210, one for each selector disk and each associated control pin 190. The outer end of each slide 210 related to a selector disk has a slot 211 receiving the pin 190 controlled by the same selector disk (see Figs. 6, 12, 13). As pins 190 move to their differential positions and are locked therein, they corre-

spondingly set connected slides 210 in such differential positions.

Each slide 210 has a depending finger 212 formed with vertically disposed slot 213. Located in the slot is pin 214 carried by the side of notched arm 215 pivotally carried, on pivot pin 215' by the lower end of rack sector 216.

There are three rack sectors 216 which pertain to amount disks 100D, d, c. These sectors have upper teeth 217 meshed with pinions 218 and 219 having one-way driving connections to respectively descending and ascending registers 220 and 222. The amount sectors also have lower teeth 223 meshed with pinions 224 of type wheels 225 for printing the dollars, dimes, and cents orders of the postage.

There are three sectors 216 pertaining to weight disks 50 and zone disks 100Z and these sectors do not have upper teeth since they do not operate registers but have only lower teeth 223 to operate type wheels 225.

The dollars, dimes, and cents orders of elements will be explained first, with particular reference to Fig. 13. Notched arms 215D, d, c are alike, each having nine notches representing, as indicated in Fig. 13, values 9 to 1 in descending order. When pin 190D, d, or c moves to differential position, it correspondingly moves connected slide 210 which through coacting slot 213 and pin 214 rocks associated arm 215 about pivot pin 215' to a corresponding differential angular position. This places one of the notches 9 to 1 of the arm in the path of movement of actuating tooth 227 provided on the end of member 228 rotatably carried by stationary shaft 229. Member 228 has a follower roller 230 engaged with cam 231 fixed on shaft 146a which is an extension of one-revolution shaft 146. After pins 190 have been locked in differential positions and, therefore, after arms 215 have been set at equivalent angles, cams 231 rock members 228 and their teeth 227 clockwise (Figs. 12, 13) against resistance of springs 232. During the clockwise stroke of a tooth 227, it engages one of the notches 9, 8,—1, of arm 215, selected by the angular setting of the arm and moves the arm and its sector 216 till the end of the forward stroke. If the tooth engages a 9 notch, it moves the sector through nine differential steps. An 8 notch is engaged by tooth 227 one differential step later, a 7 notch is engaged two differential steps later, and so on. If arm 215 is set at its maximum inclination under control of a "0" selector disk step, then tooth 227 passes beneath the lowest notch of arm 215 and does not move sector 216 at all.

Sectors 216D, d, c, through teeth 217 and pinions 218 and 219, transmit their differential movements to registers 220 and 222 to subtract the postage amount from the former and to add this same value to the latter register. Simultaneously the amount sectors, through lower teeth 223 and pinions 224 transmit their differential movement to type wheels 225 to set type lugs 225' for printing the amount of postage.

Further details of above mechanism and operation are given in my copending application, Serial No. 5,026, filed February 5, 1935.

The operation of the weight and zone elements will now be explained, with particular reference to Fig. 12. As previously stated, sectors 216W, w and Z are provided only with lower teeth 223 to operate only type wheels 225W, w and Z. Notched arms 215W, w and Z as indicated in Fig. 12 differ from arms 215D, d, and c in having ten notches instead of nine. The first

nine notches, in descending order correspond to values 9, 8, 7—1. The tenth and lowest notch corresponds to arbitrary symbol = which indicates that no weight or zone selecting operation has occurred.

Referring to the radial distance between a successive pair of control steps of a selector disk as the differential, the amount selector disks 100 D, d, c have their successive steps 9, 8, 7—0 spaced apart a single differential. The successive steps 9, 8, 7—1 of the weight and zone selector disks are also spaced apart a single differential. But differing from the amount selector disks, the weight and zone disks have twice the given differential between the 0 and 1 steps.

Accordingly, when sensing fingers 150W, w, or Z reads a 0 step of selector disks 50W, w or 100Z, it moves two differentials past the 1 step. Correspondingly, pin 190 connected to one of these sensing fingers, the slide 210 coupled to the pin, and the arm 215 set by the slide move the equivalent of the aforesaid two differentials. Thus, under control of a 1 step of a weight or zone selector disk, the associated arm 215 is positioned at an angle such that its 1 notch is in the path of actuating tooth 227. Under control of a 0 step of a weight or zone selector disk, associated arm 215 will be set at an angle such that tooth 227 during its clockwise stroke will pass beneath the lowest notch = of the arm and will not move the arm. Thus, in moving from 1 to 0 position under control of a weight or zone selector disk, the arm 215W, w or Z skips its = position.

The notches of arms 215W, w, and Z are so proportioned as to cause teeth 227 during their clockwise or forward stroke to move the arms through zero to ten differential steps. The differential distance thus moved by an arm 215W, w, or Z is smaller than the differential distance moved by an arm 215D, d, or c because type wheels 225W, w, and Z have eleven type 225' instead of the ten on the amount type wheels and accordingly the distance moved by the type wheel 225W, w, or Z to bring successive type to printing position is correspondingly smaller.

If a 9 notch of a weight or zone arm 215 is engaged by the tooth 227, the arm, connected sector 216, and type wheel 225 will be moved ten differential steps and the type wheel will accordingly bring the 9 type to printing position. Similarly, engagement of 8, 7—1 notches by tooth 227 causes movement of the type wheel through 9, 8, 7—2 steps to bring type 8, 7—1 to printing position. Engagement of notch = by tooth 227 causes the type wheel to move only 1 step to bring the = type to printing position.

Since the weight and zone selector disks have no intermediate step between their 0 and 1 steps, it is evident they cannot control associated arms 215 to select the = notches for cooperation with teeth 227. The selection of the = notches takes place only in the absence of weight and zone controlled operations and upon a selection, independent of the weight or zone, of the amount of postage to be registered and printed. This amount selection is effected under control of manually settable means which will presently be described.

After type wheels 225 have been set to print the amount, weight, and zone, an imprint is effected therefrom on a stamp blank. The means for feeding the stamp blanks into printing positions and the means for effecting an imprint do not enter directly into the present invention and

any such suitable means may be employed, for example, such as explained in my copending application, Serial No. 5,026, filed February 5, 1935.

Near the end of the cycle, after printing has been completed, shaft 192 is rocked counterclockwise (Fig. 6), to release lock ball 197 from the notches of disks 194, thereby permitting springs 173 to relax and restore arms 170, pins 190, and connected elements, to initial positions.

Shortly after lock ball 197 releases notched disks 194, control bar 66 is released by latch 78 for automatic return by spring 74 to initial position. This is done under control of cam 233 (Fig. 9) on cam shaft 145. The cam operates a vertically slidable link 234 (see also Fig. 4) which pivotally carries, near its upper end, a vertically disposed pawl 235 having a tooth 235' and biased counterclockwise by a spring 236.

In the initial position of the parts, shown in Fig. 9, link 234 is in lower position and a stud 237 of bar 66 is engaging the side of pawl 235 to hold its tooth 235' clear of a lug 238 of latch 78. At this time, tooth 235' is in front of the adjacent vertical side of lug 238 and if released would abut this vertical side. Accordingly, when bar 66 is advanced to the right, pin 237 withdraws from link 235 and tooth 235' abuts the side of lug 238 and is unable to prevent rise of latch 78 when notch 80 of the bar comes directly above the nose of the latch. Bar 66 is then locked in advanced position, as shown in Fig. 4. At about 220° of the cycle, cam 233 permits spring 239 connected to the upper end of link 234 to raise the link and as a result, spring 236 moves tooth 235' of pawl 235 directly above lug 238 of latch 78. The positions of the parts are then as shown in Fig. 4. Near the very end of the cycle, cam 233 depresses link 234, causing tooth 235' of pawl 235 to engage lug 238 of latch 78 and force the nose of the latch out of notch 80 of bar 66. Spring 74 thereupon retracts bar 66 and during retraction of the bar, its stud 237 again engages pawl 235 to release its tooth 235' from lug 238 of latch 78. The parts are then in their initial positions, shown in Fig. 9.

The operation of the machine under control of selector disks 50 and 100 as determined by the weight and zone selection has been explained. The machine may also be selectively controlled by manually settable mechanism.

Settable control mechanism

Often, a package shipped parcel post is insured, registered, sent C. O. D., or the like. For these services an additional charge, varying with the type of service, is made. This additional charge is independent of the weight or zone pertaining to a package.

The settable amount mechanism controls the machine to set up type wheels 225D, d, c to print the additional charges and also enter the additional charges into registers 220 and 222. These registers must therefore receive not only entries determined by selector disks 50 and 100 and dependent on weight and zone but must also receive the additional charges which are independent of weight and zone control. The totals standing on the registers are thus the result of both types of entries, one the additional charge entries, and the other the weight and zone-controlled charges.

When the settable amount control is operated, the weight and zone control is disabled to avoid interference with the selection of the charges by the settable amount mechanism. Conversely, the settable amount mechanism is disabled when

the weight and zone selections of the charges are made. Further, since the settable amount charges bear no weight or zone relationship, the stamp bearing the settable charge must be distinguished from the parcel post stamp. Since the weight and zone type wheels 225 normally stand at 0, it is not sufficient to merely retain these wheels in their normal position when the settable charge stamp is printed as the weight and zone type wheels would then print 0 weight and 0 zone indications on the stamp. The stamp would then appear to be a parcel post stamp for a zero load and local zone and the amount printed would appear to be an error produced by faulty machine operation. If the weight and zone type wheels were prevented from printing on the stamp at all, then after issue of the stamp, it is conceivable that weight and zone figures values might be forged on the stamp in their usual locations.

To characterize the stamp as a fixed or additional charge stamp in contradistinction to a parcel post stamp, to avoid printing 0 weight and 0 zone, and to prevent forging of weight or zone values in blank weight and zone locations of the stamp, the settable amount controls when operated cause the weight and zone type wheels 225 to move one step to set the type lug 225' bearing legend = in position to print on the stamp.

The additional or settable charge stamp may have a value running into dollars. Therefore, three denominational orders of settable element relating to cents, dimes and dollars, are provided. The elements related to these several denominations may be distinguished by the character D, d, or c appended to a common reference character and respectively signifying dollars, dimes, and cents. Fig. 2 shows the location of the settable amount levers 240D, d and c. These levers are located at the top of main casing 32 between zone selection indicating plate 108 and meter MR which contains registers 222 and 220 and printing wheels 225. Fixed to the top of casing 32 is a curved plate 241 (Figs. 2, 3, 6, 13) having slots along which levers 240 move and indications 0 to 9 alongside each lever to indicate the position to which the lever is to be set for selecting values 0 to 9 in its denominational order. Levers 240 are rotatably mounted on a common shaft 242 (see also Figs. 9, 10) which is journaled at one end in frame plate 28 and at the other end in frame 243.

Each lever 240 is formed with a sector-shaped plate portion 240', one arc of which is provided with ten interdental notches 240a (see Fig. 3), one notch for each of the ten differential value positions of the lever. Arranged to coact with notches 240a is stud 244 transversely projecting from the upper end of arm 245 rotatably carried by shaft 192. There is one arm 245 and stud 244 for each lever 240 and each arm is connected to an individual spring 246. Thus, studs 244 form impositive latches coacting with notches 240a to releasably retain levers 240 in any of their selected, settable, value positions.

At the right-hand side of each lever 240 (as viewed in Fig. 10), also rotatably mounted on shaft 242, is a paired gear sector 247 integrally formed with an arm 247' having a stud 247a connected by spring 248 to plate 240' of lever 240 (see Fig. 13). Spring 248 normally holds pin 247a of gear sector 247 engaged with the lower edge of plate 240' of lever 240. Clockwise movement (Fig. 13) of lever 240 to set it in a differential value position 1 to 9, through spring 248,

draws arm 247' in the same direction to set gear sector 247 in a differential position corresponding to the value selected by lever 240. While spring 248 may yield during this operation, when lever 240 stops, the spring immediately moves pin 247a against the lower edge of plate 240', thus causing sector 247 to take the same differential position as its operating lever 240.

Meshed with each gear sector 247 are rack teeth 249 of a vertical, interposer-control bar 250 vertically slidably mounted on shafts 192 and 166. Bar 250 is formed along one side with steps 250'—0 to 9 progressively increasing in horizontal distance from the vertical center line of shafts 166 and 192 by a differential amount which is equal to the differential of the steps of the selector disks.

Similarly to the amount selector disks 100D, d, c, the distance between 0 and 1 steps 250' is a single differential instead of a double differential as is the case with the weight and zone disks 50 and 100. Bars 250D, d, and c are respectively at the right side (Fig. 10) of sensing fingers 150D, d, c of the amount selector disks 100D, d, c. Each amount sensing finger has at its left or rear end (Fig. 13), a lug 150' transversely projecting into the plane of the companion bar 250 and its steps 250' (see Fig. 11).

Levers 240 are manually moved to required value positions. The levers correspondingly rock gear sectors 247 which through teeth 249 proportionally lower bars 250, setting steps 250', which correspond to the selected values, in the paths of lugs 150' of fingers 150D, d, c. For instance, dimes order lever 240d is set at 5, lowering bar 250d to bring its step 250'—5 in the path of advance of lug 150' of sensing finger 150d.

When a bar 250 is in initial, zero, upper position, the zero step 250' is in front of lug 150' and finger 150 is permitted to move to its forward limit into engagement with any step of the amount selector disks 100.

If one of steps 250'—1 to 9 of a bar 250 and one of selector disk steps 1 to 9 were simultaneously in position to control a finger 150, then the finger would be stopped either by a step 250' or by a selector disk step depending on which step was a higher value. It is therefore necessary to provide for selective, non-coincident control of fingers 150D, d, c by bars 250 and selector disks 100D, d, c.

As previously explained, selector disks 50 and 100 move only 270° from zero to maximum load positions and have selector steps along only 270° of their peripheries. The remaining 90° arc of each selector disk is bare of steps, has no control function, and may be called the non-controlling arc. The non-controlling arc of a selector disk is along a circle having a radius equal to that of the lowest or zero step of the selector disk. When the selector disks are in home position, their non-controlling arcs are opposite sensing fingers 150 (see Fig. 6). Therefore the fingers, when moved towards the selector disks while the latter are in home position may move unimpeded to the limit of their forward stroke. Since the selector disks are held in home position by detent 57 which is releasable by operation of control bar 66 (Fig. 7), then in the absence of operation of bar 66 the selector disks will remain set in home position even though a load be applied to the weighing mechanism.

It is therefore necessary to hold bar 66 in retracted position to in turn maintain the selector

disks in home position in order that stepped bars 250 be selected to control fingers 150.

Conversely, when the selector disks are selected to control fingers 150, then bars 250 must be located in their zero positions in order not to interfere with control of the fingers by the steps of the selector disks.

It is also desired during control of the machine by the settable mechanism, to set the weight and zone fingers 150W, w and Z in tenth differential position corresponding to symbol =. This tenth position requires that the weight and zone fingers be moved nine differential steps further than their initial 9 position.

Since selector disks 50W, w, and 100Z are in home position when control bars 250 are effecting control, then the non-controlling arcs of these disks are in front of their sensing fingers and therefore the disks will not interfere with the positioning of fingers 150.

A multiple part push button is provided to render stepped bars 250 effective to control the machine. This push button comprises an upper part in the form of a key 252 (Figs. 2, 9, 10, 12) projecting above the top of casing 32 and vertically slidably carried by pins 253 and 254 secured to the side of bar 255 which comprises the lower part of the push button. Spring 256 between pin 253 of bar 255 and pin 257 of key 252 normally holds the key elevated with respect to the bar. The key pivotally carries on pin 258, a coupling pawl 259 which is also connected by spring 260 to pin 257 of the key. Spring 260 normally urges pawl 259 counterclockwise (Fig. 12) to maintain the lower tip of the pawl engaged with the side of horizontally bent lug 261 formed on bar 255 adjacent its upper end. In this position of pawl 259, its lug 262 is directly above lug 261, as shown in Fig. 12.

Bar 255 is vertically slidably mounted on shafts 192 and 166 (see Fig. 9) and has a stud 263 passing through the slotted end of arm 264 fixed to shaft 265 (Figs. 9, 11, 12) journaled by frame plates 28 and 243. Shaft 265 rigidly carries bail arms 266 carrying cross bar 267 extending above the three weight and zone sensing fingers 150 and of such length as to span only these three fingers (see Fig. 11).

When bar 267 is lowered, it is located in position to intercept lugs 150' at the rear end of the weight and zone fingers 150 and stop these fingers in their = position. When bar 267 is in upper position, shown in Fig. 12, it is above the path of lugs 150' of the weight and zone fingers 150 and unable to stop advance of the fingers.

The lower end of push button bar 255 has a stud 268 seated in the slotted right hand end (Fig. 9) of the horizontal arm of bell crank 270. The vertical arm of the bell crank is connected by pivot pin 271 to the left end of horizontally disposed link 272.

Link 272 at its right end passes through a vertical slot formed in the upper end of vertical arm 124' of latch 124 which, as previously explained, is operated by clutch solenoid 122 upon setting of the selector disks in load position. The slot guides the link for horizontal movement and is open at the top. Normally, link 272 rests on the bottom of the slot. The extreme, free end or tip of the link extends past arm 124' and is enlarged to form a shoulder 272' adapted to engage the side of arm 124'.

Push button bar 255 has near its lower end a pin 274 seated in the slotted, left-hand end (Fig. 9) of lever 275 pivoted to frame plate 28. The

right-end of lever 275 is bent transversely to provide lug 275'. Normally, lever 275 is in clockwise position with its lug 275' to the right of and clear of an arm 276 when the latter is also in normal position, Fig. 9. Arm 276 is rigid with sleeve 277 rotatably carried by rod 193 (see also Fig. 6). With arm 276 in normal position, rocking of lever 275 counterclockwise raises its lug 275' into position adjacent the right side of arm 276 and prevents counterclockwise rocking of the arm. With lever 275 in normal position, rocking of arm 276 counterclockwise disposes its lower end above lug 275' to prevent counterclockwise rocking of lever 275.

Sleeve 277 which rigidly carries arm 276 is rigidly provided with depending operating arm 278 (Fig. 9), slotted at its lower end to receive pin 279 of control bar 66.

When the operator depresses key 252, lug 262 of pawl 259 engages lug 261 of bar 255 to transmit downward motion of the key to the bar. The common descent of the key and bar is against resistance of spring 280 connected to the bar at one end and to a sleeve on shaft 192 at the other end. As bar 255 descends, its pin 274 rocks lever 275 counterclockwise (Fig. 9), placing lug 275' in back of arm 276. As a result, control bar 66 is prevented from advancing to operative position because arm 276 being now held by lug 275' against counterclockwise motion, arm 278 is likewise incapable of counterclockwise rocking, thereby holding pin 279 of bar 66 against advance movement. Thus, bar 66 cannot be advanced after key 252 is depressed, preventing in this manner concurrent operation of the key and control bar.

Depression of bar 255 also through its pin 263 rocks arm 264 counterclockwise (Fig. 12) thus turning shaft 265 in the same direction to move bail bar 267 downwardly into position to engage lugs 150' of the weight and zone sensing fingers for stopping advance of the latter in their tenth, =, position.

Further, depression of bar 255 through its pin 268 rocks bell crank 270 clockwise (Fig. 9) moving link 272 to the left, causing shoulder 272' at the right end of the link to engage the side of latch arm 124' and rock latch 124 counterclockwise against resistance of spring 125. The latch thereupon releases arm 126a for movement to the right by spring 127, arm 126a disengages clutch pawl 120, and disk 129 is coupled to driving shaft 30 for a single revolution, in the same manner as under control of solenoid 122.

Clockwise movement of detent arm 126a by spring 127 is limited by engagement of arm 126c with base plate 282. With arm 126a at its clockwise limit and latch 124 at the counterclockwise limit to which it is moved by link 272, the left, free end of the latch is below lug 126' of arm 126a by a certain amount of clearance, as indicated in Fig. 8. Engaging the top of stud 133 of driven disk 129 is a finger 284 rigidly depending from link 272. When the link has completed its movement to the left, the edge of finger 284 is still on stud 133. As disk 129 is now released for a cycle, stud 133 moves clockwise and raises finger 284 slightly. This causes link 272 to rock freely counterclockwise on pivot pin 271, raising shoulder 272' above the bottom of the notch in latch arm 124', thereby releasing latch 124 for clockwise rocking by spring 125. The latch moves clockwise until its free end contacts the bottom of lug 126'. This movement of the latch locates the bottom of its notch below the enlarged tip

of link 272. Stud 133 of disk 129 engages finger 284 momentarily and as soon as the stud passes the finger, link 272 drops and its enlarged tip comes to rest against the bottom of the notch.

5 As previously explained, at 180° of the cycle stud 132 depresses arm 126b to return detent arm 126a to declutching position. This releases lug 126' of arm 126a from latch 124. Spring 125 thereupon rocks latch 124 further clockwise to
10 restore it to normal position again engaged with the front of detent 126a to retain the latter in declutching position.

The push button bar 255 has two short teeth 285 coacting with pawl 286, urged clockwise by
15 spring 287 (Fig. 12). Half-way depression of the push button engages the top of the bottom tooth with pawl 286 to stop the button in half-way position. Full stroke depression of the button engages the top of the upper tooth with pawl 286
20 to stop the button in fully depressed position. The full down stroke of the push button should, for practical reasons, not be required to cause link 272 to initiate the cycle of operations of actuator 129 because to depend on the slight, final,
25 increment of movement of the parts to initiate the cycle would entail too fine-haired an operation and adjustment of the parts. The cycle should be and is initiated by a movement of the push button just short of a full down stroke.
30 Such movement of the push button is less than the combined length of the two teeth and if the depression of the button is not continued to the end of its stroke, the upper tooth 285 will not be engaged by pawl 286 and spring 280 will raise
35 the push button until the lower tooth engages the pawl and causes arrest of the button in half-way position.

In the half-way position of the push button, bail bar 267 will be in operative position to coact
40 with lugs 150' of the weight and zone fingers 150 to stop these fingers in = position. Also, in the half-way position of the push button, lug 275' will be behind arm 276 and operative to prevent movement of control bar 66.

45 Thus, after the cycle of the actuator had been initiated by depression of the push button through a distance just short of its full stroke, all the other conditions required of the push button operation also will have been satisfied. Had there
50 been only one long tooth instead of two short teeth 285, less than full stroke depression of the push button might have initiated operation of the actuator and there would be nothing to prevent the button from then returning to normal, raised position.
55 The bar 267 would then be in ineffective position and further control bar 66 would be free to advance. For these reasons, two short teeth 285, instead of a single long one, are provided on bar 255.

60 The operation of the machine under control of the settable mechanism now proceeds in the same manner as under weight and zone control, initiated by advance of control bar 66. Between 0 and 30° of the cycle, cam 188 (Fig. 9) on cam
65 shaft 146, through link 184 and arm 183, rocks shaft 169 clockwise causing bail rod 180 through springs 182 to yieldingly move arms 168 clockwise (see Figs. 6, 12, 13) and thereby advance fingers 150. The three amount sensing fingers
70 150D, d, c advance until their lugs 150' abut steps 250' in control position (see Fig. 13). Fingers 150D, d, c are thereby arrested in differential positions corresponding to the values selected by hand levers 240.

75 The three weight and zone fingers 150 advance

nine differential steps from their initial, 9, position until their lugs 150' engage cross bar 267 (see Fig. 12), causing the fingers to stop in their tenth position, corresponding to character =.

The position of the sensing fingers determines 5 the position of companion arms 170 and their pins 190, as previously explained. At 30° of the cycle, the differential position of each pin 190 has been determined. Between 35° and 50° of the cycle, shaft 192 is rocked clockwise to engage lock
10 bail 197 with the aligned notches of disks 194, thereby locking pins 190 in their differential positions.

Pins 190 controlled by the weight and zone fingers set stepped arms 215 with their tenth
15 notches, corresponding to =, in position to be engaged by actuating teeth 227W, w, Z. Under control of cams 231, elements 227 then move through their forward, down stroke (Fig. 12) during which they engage notches = of the weight
20 and zone arms 215 to cause their sectors 216 to turn type wheels 225W, w, and Z counterclockwise, bringing type lugs 225' bearing legend = into printing position.

Pins 190 of amount sensing fingers 150D, d, c 25 position their stepped arms 215 in accordance with the values determined by steps 250' of settable bars 250. Elements 227D, d, and c then engage the notches of the arms 215D, d, and c which correspond to the settable values and move the
30 connected sectors 216D, d, c differential distances equivalent to said values. The latter sectors, through lower teeth 223, position type wheels 225D, d, and c to print these values and through upper teeth 217 enter the values into descending
35 register 220 and ascending register 222.

At about 345° of the cycle, after the printing and registering operations have been completed, shaft 192 (Figs. 6, 12) is rocked anticlockwise to release lock bail 197 from the notches of disks 194
40 permitting springs 173 to restore arms 170, their pins 190, and connected elements to initial retracted positions. As indicated in Fig. 12, shaft 192 has an arm 290 pivotally carrying, at its free end, a by-pass dog 291 held by spring 292 against
45 pin 293 of arm 290. When shaft 192 is rocked clockwise at 35° of the cycle, to move lock bail 197 into engagement with notched sectors 194, arm 290 moves down from full line position, Fig. 12 to dotted line position. When at 345° of the cycle,
50 shaft 192 rocks anticlockwise to release lock bail 197 from sectors 194, arm 290 rises from dotted to full line position. During this return movement, the top of dog 291 engages the bottom of horizontal arm 294 of pawl 286 to move the pawl
55 out of engagement with teeth 285 of push button bar 255, permitting spring 280 to restore the push button. Dog 291 holds pawl 286 in releasing position long enough to permit complete restoration of bar 255 to its normal position after which, with
60 continuation of the rise of arm 290, the tail 295 of dog 291 engages fixed stud 296, resulting in the dog rocking clockwise with respect to arm 290. This brings the dog beyond the tip of arm 294 of pawl 286, permitting spring 287 to reengage the
65 pawl with teeth 285 to hold bar 255 in its normal position, Fig. 12.

If the operator held down key 252 at the time bar 255 was released for return to raised position, he would prevent restoration of bar 255 if lug 262
70 of the key were permitted to remain engaged with lug 261 of the bar.

To effect restoration of bar 255 regardless of maintained depression of key 252, when pawl 286 is rocked counterclockwise by dog 291, to release
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teeth 285, the pin 286' of the pawl engages coupling pawl 259 and rocks it to the left against resistance of spring 260 (Fig. 12). This results in displacing lug 262 from above lug 261, thereby uncoupling bar 255 from key 252 and permitting the bar to rise unhindered by the key. When the operator subsequently releases key 252, spring 256 elevates the key and spring 260 returns lug 262 of the coupling pawl to operative position above lug 261 of bar 255.

Only when push button bar 255 is in normal position, may operation of the machine be initiated by control bar 66. With the push button in normal position, lug 275' of lever 275 is in lower position and out of the way of counterclockwise movement of arm 276 (Fig. 9). Accordingly, advance of control bar 66, which is possible only when arm 276 is free to move counterclockwise, is not prevented by lug 275'. Advance of bar 66 moves arm 276 counterclockwise to position its lower edge above lug 275' to prevent counterclockwise rocking of lever 275 and, consequently, depression of push button bar 255. Thus, when bar 66 is in operative position, it locks the settable control mechanism out of operation.

Since depression of the push button before control bar 66 is advanced, locks the latter in retracted, inactive, position by means of engaging lug 275' with the right-side of arm 276, it is apparent that the settable control mechanism and the weight-controlled mechanism may not operate concurrently but may only operate selectively.

Although the push button is normally automatically returned to initial position at the end of a cycle initiated thereby, the value selecting levers 240 remain locked in set positions by engagement of their sector notches 240a with latch arms 245. Should stepped control bars 250 which have been set by levers 240 be permitted to remain in control positions 1 to 9 after the cycle, then steps 250'—1 to 9 might interfere with control, by the amount selector disks, of sensing fingers 150. Accordingly, whenever control bar 66 is advanced to initiate weight-controlled operations, control bars 250 are automatically returned to zero positions, without at the same time disturbing the setting of selection levers 240. To accomplish this, control bar 66 has a stud 300, intermediate its ends, which is seated in the lower, slotted end of lever 301 pivoted to frame plate 28 (see Fig. 9).

Lever 301 is connected by link 302 to crank arm 303 fixed to the left end of shaft 242 (Figs. 9, 10) which journals selection levers 240 and connected gear sectors 247 (Fig. 13).

Rigidly carried by shaft 242 is bail 304 (Figs. 6, 10, 13) spanning the three settable levers 240 and connected sectors 247. When control bar 66 is advanced, its pin 300 (Fig. 9) rocks lever 301 anticlockwise which through link 302 moves arm 303 and shaft 242 in the same direction. Referring to Fig. 13, such movement of shaft 242 engages bail 304 with the free ends of arms 247' of gear sectors 247 to return the sectors to their counterclockwise limits. As the sectors return, they raise stepped bars 250 to zero position. When sectors 247 are moved counterclockwise by bail 304 they tend, through springs 248, to draw levers 240 after them. But springs 248 are much weaker than springs 246 which hold arms 245 in locking coaction with levers 240.

As a result springs 248 stretch without disturbing the selected positions of levers 240. This does away with the necessity for resetting levers 240 when it is desired to operate the machine, after

each of a series of weight-controlled operations, in accordance with the same manually selected, settable, values.

When control bar 66 returns to home position near the end of the cycle initiated thereby, bail 304 moves up and gear sectors 247 are returned by springs 248 until pins 247a contact the lower edge of sectors 240' of levers 240. The gear sectors are thus reset in the positions selected by levers 240 and correspondingly stepped bars 250 are reset to the selected value positions.

Summary

Assume a package weighing 10 lbs. 1 oz. is to be shipped parcel post to zone 3 and that it is to be insured; say, for a charge of 25 cents. The package is placed on platform 10 (Figs. 1, 2, 6, 9) causing levers 13, 14, 18 to rock pendulum shaft 22 in proportion to the load of 10 lbs. 1 oz. Chart 30 will indicate this weight at sight window 31 (Fig. 2). The operator then sets handle 105 opposite indication "3" on zone indicating plate 108, thereby shifting tubular shaft 102 to bring disks 100Z, D, d, and c corresponding to zone 3 into control positions in front of their reading fingers 150Z, D, d, and c.

After the zone setting, the operator depresses handle 64 (Figs. 1, 2, 9) thereby moving control bar 66 to advanced position in which it is latched by detent 76 (Figs. 4 and 9). Bar 66, when it advances, moves bar 70 (Figs. 1, 6, 9) to engage its shoulder 72 with arm 73 of shaft 62 and cause the latter to rock counterclockwise (Fig. 6), thereby releasing stop 57 from pin 56 of disk 55 which is rigidly carried by shaft 35.

The power drive including motor driven shaft 38, shaft 39, sprocket chain 41, friction coupling 44—45—46 thereupon is effective to rotate shaft 35 counterclockwise (Fig. 6). The initial angle of rotation of shaft 35 causes cam 85 thereon to operate lever 86 to move knife edge 83 (Fig. 7) into a notch 82a of disk 82 carried by chart 30. As a result, chart 30 is set in even pound position, which, in the assumed case, is 11 lbs.

As shaft 35 continues its rotation brushes 94 and 95 thereon engage contact plate 92 carried by chart 30, causing the circuit of magnet 97 to be established. The magnet operates its armature 97a to rock latch 99 into engagement with a notch 55a of disk 55, thus arresting shaft 35 in 11 lb. position.

When latch 99 arrested shaft 35, its pin 118 closed switch 120 (Fig. 6) to complete the circuit—initiated by closing of switch 662 by bar 66—of clutch solenoid 122. The latter thereupon releases latch 124 from arm 126a (Fig. 9) to permit the latter to in turn release clutch pawl 128 for coupling disk 129 to drive shaft 36.

Disk 129 is driven for a single revolution and actuates cam shafts 145 and 146. Cam 138 on shaft 146 through link 134 operates cross rod 130 to impositively advance paired arms 160 and 170 and reading fingers 150 connected to arms 170. The paired arms are differentially arrested by engagement of the reading fingers with disks 50W, w, 100D, d, c, and Z. Pins 190 of arms 170 are locked in corresponding differential positions and correspondingly set connected slides 210 (Figs. 6, 12, 13) to rock notched arms 215 of meter MR into equivalent angular positions. Cams 231 then operate to cause members 227 to engage the selected notches of arms 215 to differentially rock sectors 216 clockwise (Figs. 12, 13).

The amount sectors 216D, d, and c enter the

values taken from the selector disks 100D, d, and c and equal to the value of the parcel postage for a weight of 11 lbs. in zone 3 into descending register 220 and ascending register 222 and at the same time position type wheels 225 to print this amount. Weight and zone sectors 216 set their type wheels 225 to print a weight of 11 lbs. and zone indication "3".

At the end of the cycle of operations, latch 78 releases control bar 66 and the latter is returned by spring 74 to normal, retracted, position.

The operator now sets variable charge selecting levers 240d and c to positions 2 and 5, respectively, to select 25 cents to be entered into the registers 220 and 222 and to be printed. In setting levers 240, bars 250 are similarly set to control fingers 150d and c. Key 252 is now depressed to lower push button bar 255. The latter through pin 274 and lever 275 locks arm 276 and connected control bar 66 against operation. Through pin 263, bar 255 sets cross rod 267 (Fig. 12) into position in front of lugs 150' of fingers 150W, w, and Z. Through pin 268, bar 255 operates lever 270 to cause link 272 to engage arm 124' of latch 124 to release arm 126a and thereby initiate a cycle of operations of disk 129, cam shafts 145 and 146 and the parts operated thereby, as in the weight controlled operation. Fingers 150D, d, and c advance until their lugs 150' engage steps 250' of bars 250 (Fig. 13) and fingers 150W, w, and Z advance until their lugs 150' engage rod 267. The latter fingers are thereby arrested in positions corresponding to symbol = while the amount fingers 150D, d, and c are arrested in 0, 2, and 5, positions, respectively. In the same manner as in the weight controlled operation, the amount 25 cents is entered into registers 220 and 222 and the type wheels 225D, d, and c positioned to print 0.25, while the weight and zone type wheels 225 are each positioned to print =.

In this manner the insurance charge 25 cents is entered along with the parcel post charge into registers 220 and 222 and the type means upon the entry of the insurance charge set to print the insurance charge along with symbols = to indicate a non-weight and non-zone selecting operation.

While the invention has been described in connection with the specific embodiment shown herein, it is to be understood that variations, changes, and departures may be made within the field of the invention and that the invention is therefore to be limited only by the scope of the following claims.

I claim:

1. In combination; an entry-receiving element, entry determining mechanism, supplementary entry determining mechanism, an automatic cyclical actuator, computing mechanism operated by the actuator during a single cycle thereof for effecting entry into aforesaid element under control of either determining mechanism, means for selectively rendering the determining mechanisms effective to control entry operations of said computing mechanism, and devices coacting with the determining mechanisms upon their being selectively rendered effective, for initiating a single cycle of operations of said actuator.

2. In combination; a register, entry selecting mechanism, supplementary entry selecting mechanism, a cyclical actuator, computing mechanism operated by the actuator during a single cycle of

the latter for effecting entry into the register under control of either selecting mechanism, a device normally restraining operation of the actuator, means for selectively rendering the selecting mechanisms effective to control said computing mechanism, and means operated upon either of the selecting means becoming effective for disabling said device to thereby release the actuator for a single cycle of operations.

3. In combination; a register, a main entry selector, a supplementary entry selector settable in differential selecting positions, a cyclically operable actuator, computing mechanism operated by the actuator, during a cycle thereof, under control of either one of said selectors for effecting entry into the register, means for normally retaining the supplementary selector in its selected differential position after the cycle is completed, a device for rendering the main selector effective to control said computing mechanism, and mechanism operated by the device, upon its rendering the latter selector effective, for displacing the supplementary selector from its selected differential position and setting it in a position ineffective to interfere with entry control operation of the main selector.

4. In combination; variable controlled selector means for selecting variable-dependent values, type members, mechanism controlled by aforesaid selector means for setting said type members in position to print the variable-dependent values, supplementary means operable in the absence of a variable-controlled selection to control aforesaid mechanism for setting said type members in position to print supplementary values, and type means settable upon effective control operation of the supplementary means in position for printing an indication of the absence of a variable-controlled selection.

5. In combination; a selector for selecting values dependent on a plurality of factors, a value manifesting device, an exhibiting device, mechanism controlled by aforesaid selector for operating the manifesting device according to the value selected by the latter selector, means for setting the exhibiting device to exhibit a special one of the factors related to the selected value, a supplementary selector for selecting values irrespective of said factors and controlling aforesaid mechanism to operate the manifesting device according to the latter values, and means operable upon the latter operation of the manifesting device for setting the exhibiting device to exhibit an indication denoting absence of a special factor-dependent operation of said manifesting device.

6. In combination; selector means for selecting two classes of values dependent on a variable, a first device for manifesting a first such class of values, a second device for manifesting the other such class of values, mechanism controlled by said selector means for operating said devices to manifest their assigned classes of values, a supplementary selector operable to the exclusion of the selector means for selecting supplementary values of the first class, means controlled by said selector for causing said mechanism to operate the first device according to the supplementary values, and means operated during control of said mechanism by the selector for causing the second device to manifest absence of the variable-dependent selection.

FREDERICK Q. RAST.