May 17, 1966 S. J. RIGO ETAL 3,251,546

REGISTER RESETTING MEANS

Filed Dec. 24, 1964 4 Sheets-Sheet 1

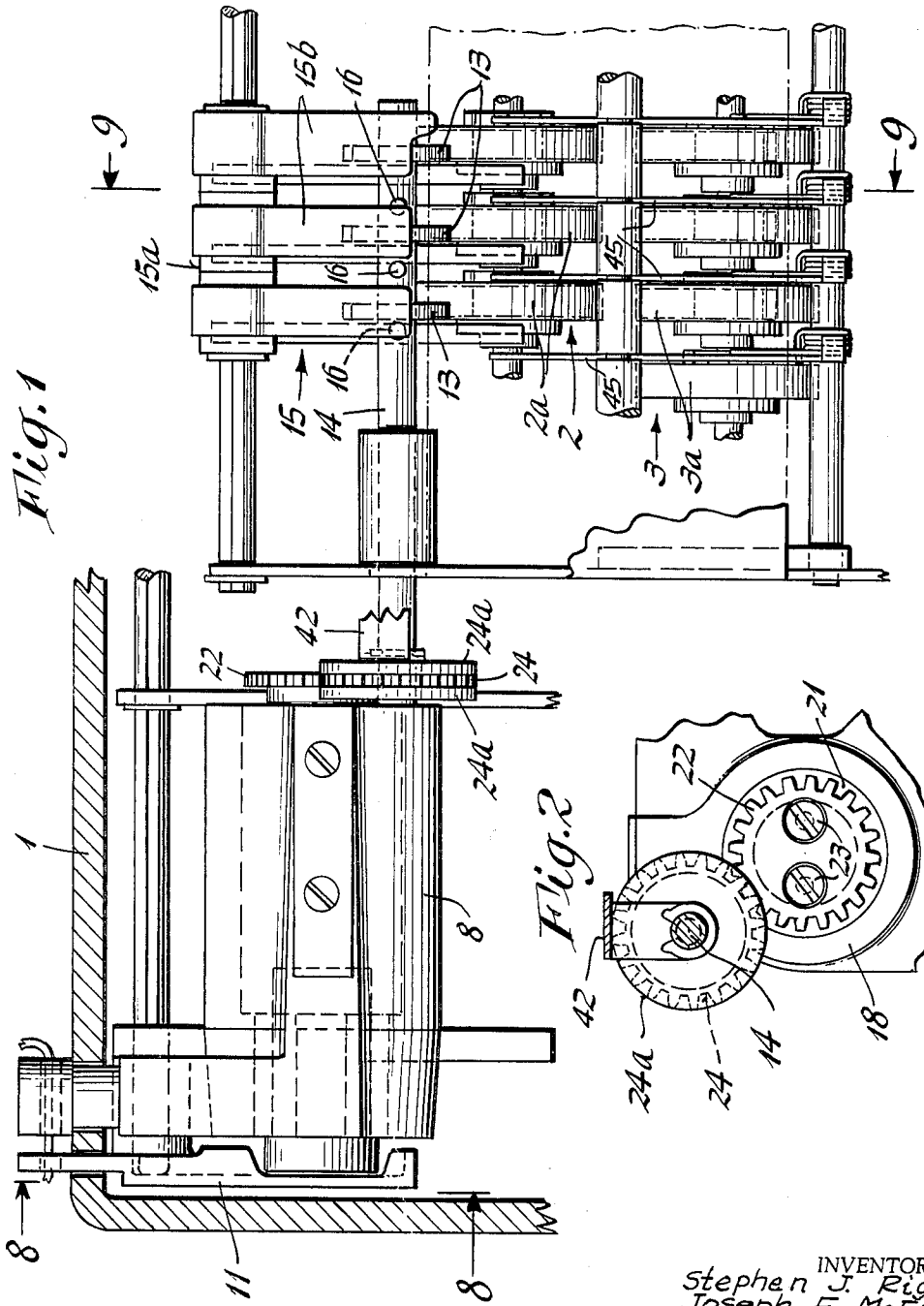


Fig. 1

Fig. 2

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REGISTER RESETTING MEANS

Filed Dec. 24, 1964 4 Sheets-Sheet 2

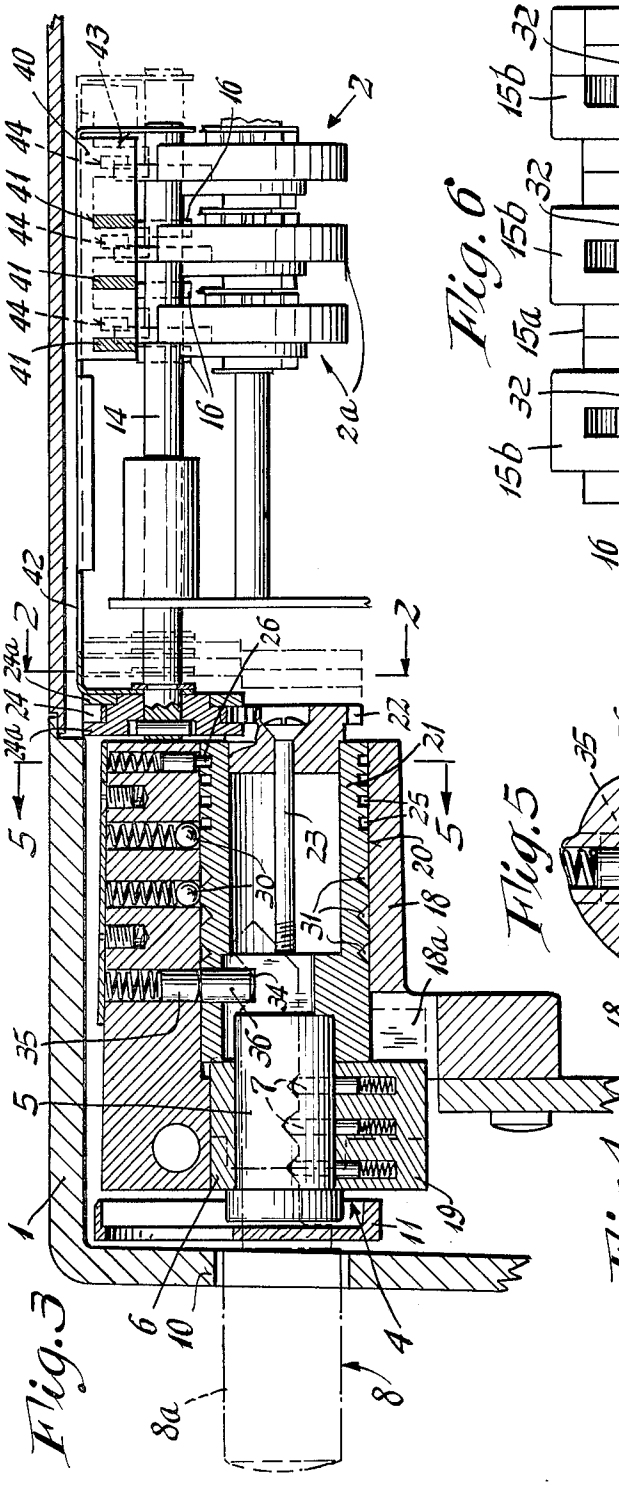


Fig. 3

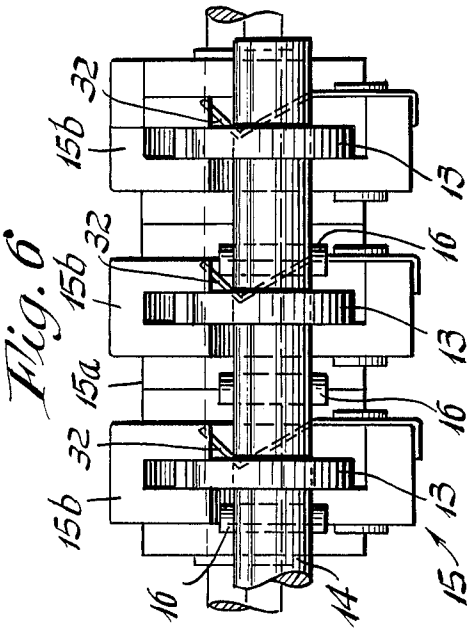


Fig. 6

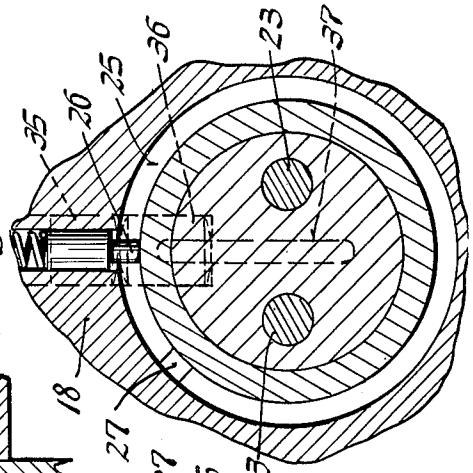


Fig. 5

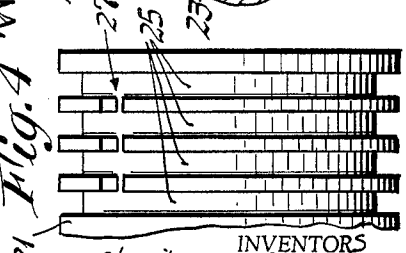


Fig. 4

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REGISTER RESETTING MEANS

Filed Dec. 24, 1964 4 Sheets-Sheet 3

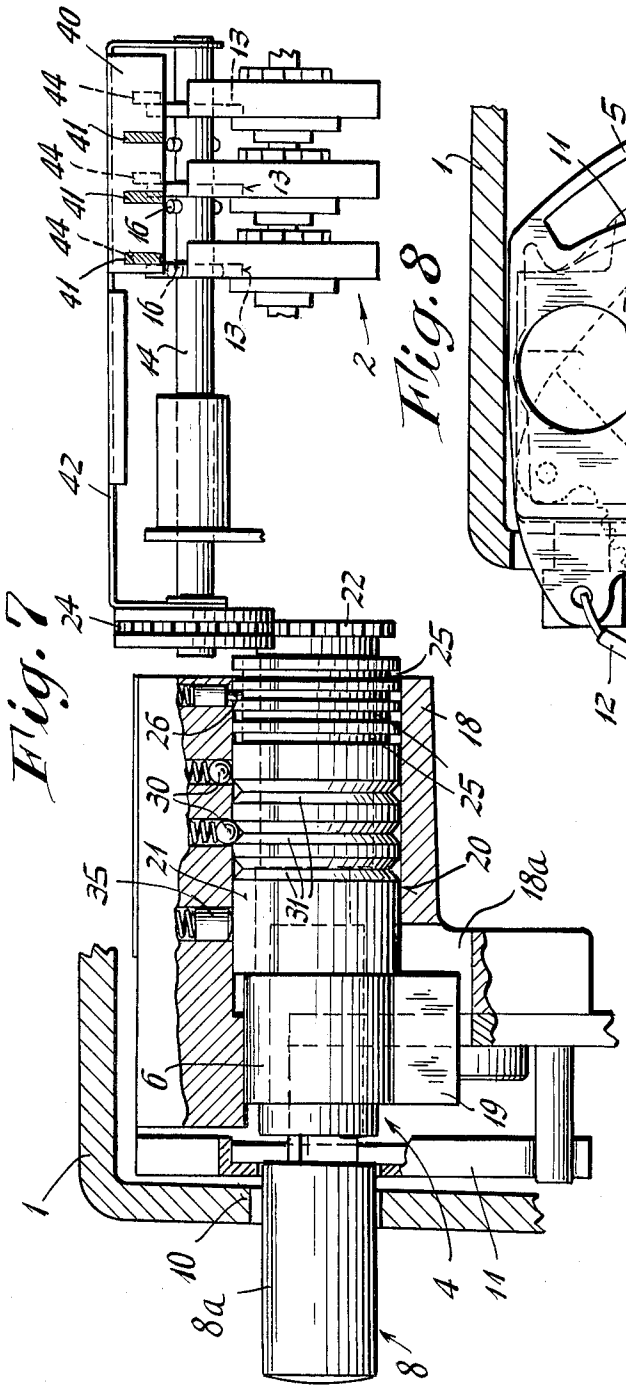


Fig. 7

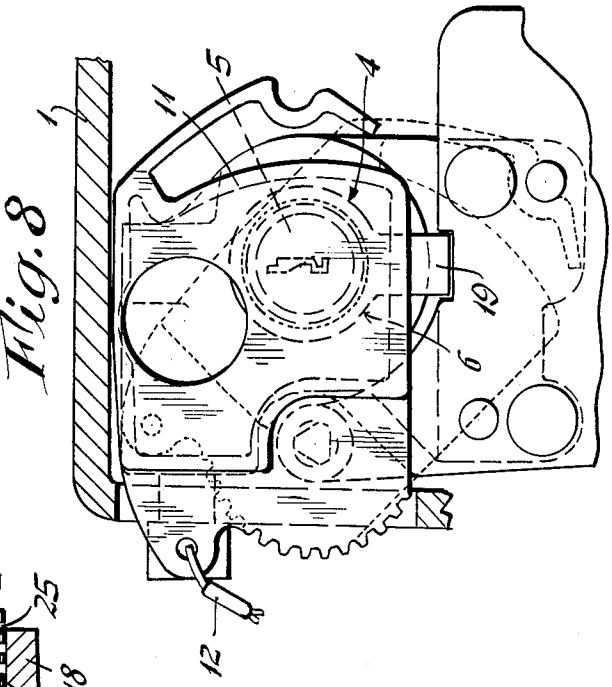


Fig. 8

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REGISTER RESETTING MEANS

Filed Dec. 24, 1964 4 Sheets-Sheet 4

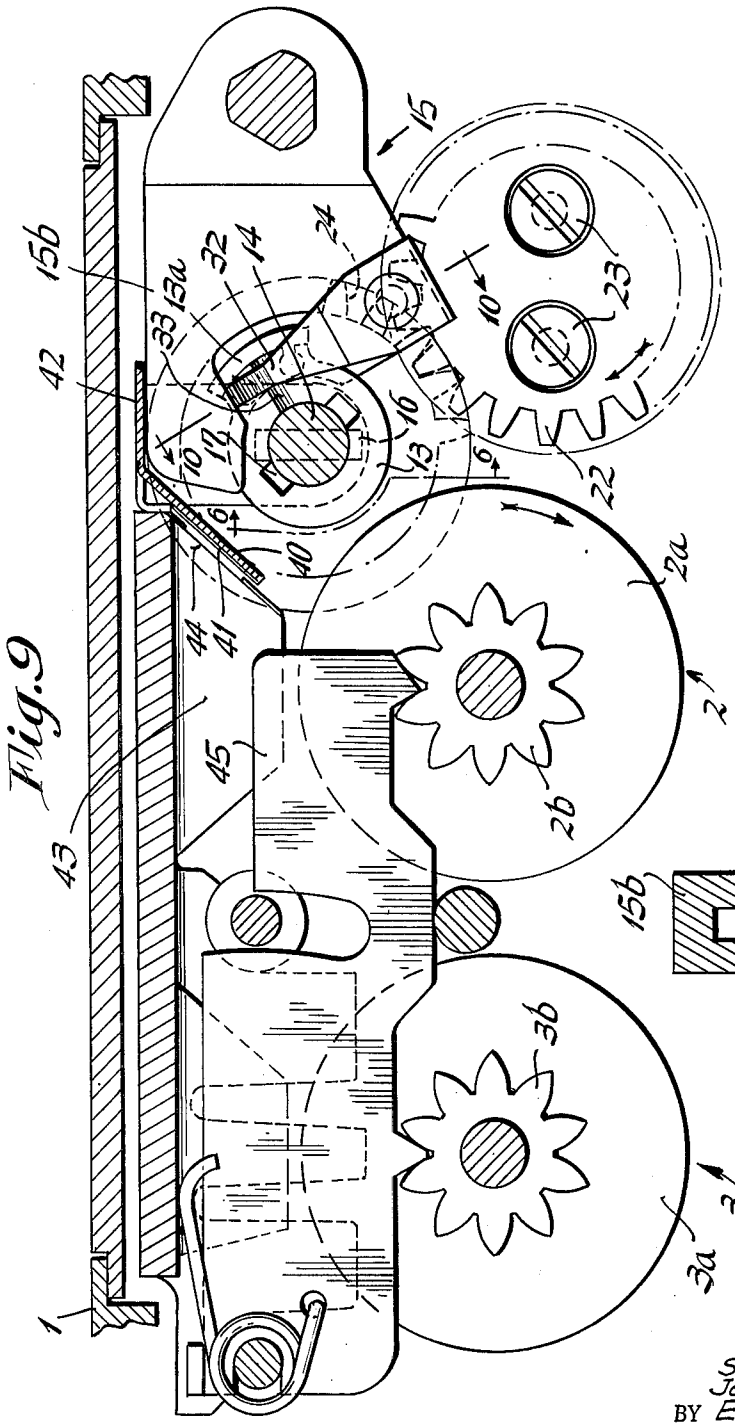


Fig. 9

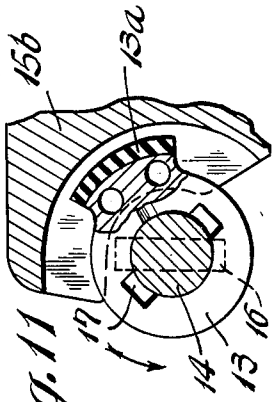


Fig. 11

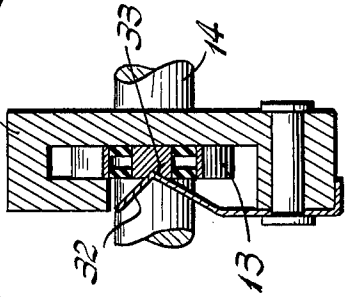


Fig. 10

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REGISTER RESETTING MEANS

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Filed Dec. 24, 1964, Ser. No. 421,039
9 Claims. (Cl. 235—101)

This invention pertains to register resetting means. More particularly, it pertains to resetting means for registers of the type which are lockable against unauthorized resetting or other operation.

A principle application of the invention is in postage meters. The subsequent detailed description will set forth one specific embodiment of the invention in such an environment. However, it will be understood that the invention can readily be applied in other types of registering devices, cash registers being just one example.

Postage meters customarily contain a descending register into which is set the postage value credit purchased. As the machine is used for printing postage upon letters, it subtracts the postage value from the descending register. In one widely used type of postage meter, when the registered value descends to something that is less than the maximum value which can be printed by the machine, the meter automatically locks out. It must then be taken to the post office, where additional postage credit is bought and the register reset to a new, higher value whereby the meter can once again be used.

The present common practice in resetting the descending register is for the post office clerk to break the machine's seal, unlock the door which blocks access to the descending register, and then by means of a stylus reset the register wheels in accordance with the amount of postage which has been purchased. This stylus technique of resetting the register wheels to a new value is cumbersome, time-consuming, and can damage the meter.

Another arrangement is shown in United States Patent No. 2,339,852 issued January 25, 1944 to W. J. Hanson et al. A resetting knob operable to reset only one order of the register is normally within the machine casing. When the machine is unlocked, the knob is spring urged to an accessible position for use outside the casing.

In accordance with the present invention, the operation of the lock itself is effective to reset the numeral wheels. In the preferred form disclosed herein, a key operated pin tumbler lock is employed. The rotary unlocking movement of the key is employed to operate suitable means for resetting the register wheels to any selected value. As a further feature of the invention, the lock with the key in it is first shiftable longitudinally to select different ones of the register dials for resetting. After resetting, the key cannot be withdrawn from the lock until it and the remainder of the resetting mechanism are returned to normal unoperated condition.

It is therefore a principal object of the present invention to provide a novel register resetting means.

It is a further object to provide a novel resetting arrangement for machines which are provided with a lock means to prevent unauthorized access to the register.

Another object is an arrangement whereby in a machine having a resettable register and a lock for preventing unauthorized access to the register, the lock itself is used to reset the register.

Another object is an arrangement whereby the lock itself is used to select different order of the register for resetting.

The above and other objects, advantages, and features of the invention will be apparent to those skilled in the art from the following detailed description of a preferred embodiment of the invention, when read in conjunction with accompanying drawings in which:

FIG. 1 is a fragmentary top plan view of a postage meter incorporating the invention;

FIG. 2 is a section taken on line 2—2 of FIG. 3;

FIG. 3 is a front elevation in section of the mechanism;

FIG. 4 is a detail view of the resetting sleeve;

FIG. 5 is a section taken on line 5—5 of FIG. 3;

FIG. 6 is a detail view taken on line 6—6 of FIG. 9 showing the resetting wheels and the drive shaft therefor;

FIG. 7 is a view generally similar to FIG. 3, showing the relative position of the parts when the leftmost order of the descending register has been selected for resetting;

FIG. 8 is a section taken on line 8—8 of FIG. 1;

FIG. 9 is a section taken on line 9—9 of FIG. 1;

FIG. 10 is a section taken on line 10—10 of FIG. 9;

FIG. 11 is a side elevational view of one of the resetting wheels.

Referring now to the drawings, the reference numeral **1** designates the outer casing of a postage meter in which the present invention is embodied. The meter includes the usual descending and ascending registers **2**, **3** (FIGS. 1, 9) each comprising an ordinarily arranged series of numeral wheels with tens transfer mechanism between adjacent wheels. Each numeral wheel **2***a*, **3***a* has associated therewith a pinion **2***b*, **3***b* which is actuated by suitable differentially rack means operable (not shown) to subtract values from the descending register and add them into the ascending register.

The machine includes a lock **4** which prevents unauthorized access to the register. In accordance with the present invention, the lock itself is used to reset the register and also to select the order to be reset.

Lock **4** is a key-operated pin tumbler lock comprising a central plug **5** rotatable within a barrel **6**. The plug is normally blocked against rotation by pairs of spring biased lock pins **7**. When the proper key **8** is inserted into the plug, it raises the pins differential amounts to align each pin-pair interface with the outer edge of the plug, and the latter is now free to be rotated by the key. The key **8**, which has a large cylindrical end **8***a* to facilitate its manipulation, is inserted into the plug through an opening **10** in the meter casing **1**. Access to the plug is normally blocked by a swingable cover plate **11** sealed in closed position (FIG. 8) by a conventional wire lead seal **12**. Under postal regulations and laws, only authorized postal employees may break the seal to have access to the lock.

In the present arrangement, after the key has been inserted into the lock, it is first rotated a short distance to condition the mechanism by freeing it for resetting of the register numeral wheels **2***a*. The key is used to shift the lock longitudinally to select a particular ordinal wheel of the descending register for resetting. Then, the key is rotated to reset the selected wheel.

At this juncture, it should be explained that a resetting device is provided for each numeral wheel **2***a* which is to be reset. Each resetting device comprises a wheel **13** (FIGS. 9–11) having a radial lobe or segment to which is affixed a concentric shoe **13***a* of yieldable rubber or similar elastomeric material. The various resetting wheels **13** are supported loosely on a shaft **14** and are held against axial movement by a comb structure **15**. The latter comprises a backing member **15***a* having forwardly extending fingers **15***b*, each having a forwardly opening slot closely receiving the related resetting wheel **13**. To reset a numeral wheel to any desired value, its associated resetting wheel **13** is rotated. On each turn of the resetting wheel, its shoe **13***a* will frictionally engage and drive the register wheel a distance sufficient to change the numeral wheel setting by a value of "1."

This incremental change in the setting of the numeral wheel will either be plus or minus depending upon the direction of rotation of the resetting wheel. The latter is rotated as many turns in the appropriate direction as is necessary to cause the numeral wheel to be reset to the desired value.

The radial spacing between each related numeral wheel **2** and resetting wheel **13** is such that the cylindrical body of the latter is spaced from the numeral wheel, whereas the outwardly projecting friction shoe **13***a* will engage and rotate the numeral wheel when the resetting wheel is operated. See FIG. 9. The arcuate length of the shoe **13***a* is such that each revolution of the resetting wheel will cause the numeral wheel to be advanced (or retracted, depending upon the direction of rotation) by a digital value of "1."

As mentioned above, the resetting wheels are normally free on shaft **14**. However any selected one of the resetting wheels is adapted to be driven by the shaft, as follows.

Extending through and fast with shaft **14** to the left of each resetting wheel **13** is a driving pin **16**. As seen in FIGS. 9–11, each resetting wheel has a radial slot **17** to closely receive the driving pin whereby the wheel is coupled in driven relationship with the shaft. As best seen in FIGS. 1 and 3 each successive right hand pin **16** is spaced a greater distance to the left of its relative resetting wheel. Shaft **14** is adapted to be shifted different amounts lengthwise toward the right from its normal left hand ineffective position of FIG. 3 to align any one of the three pins **16** in driving relation with the adjacent resetting wheel **13** lying immediately to the right thereof. It will be clear from FIGS. 1 and 3 that when any one of the driving pins is aligned with and lying in the radial slot of its resetting wheel, the other two resetting pins will be out of the plane of their related resetting wheels and will therefore be ineffective to drive the latter. Stated somewhat differently, a first rightward step of movement of shaft **14** will bring the first driving pin **16** into driving relation with the leftmost resetting wheel **13**, an additional step of movement will bring the middle driving pin into the plane of (and driving relationship with) the second from the left resetting wheel; and similarly, an additional rightward step of movement of the shaft will place the third, rightmost pin **16** is driving relation with the third resetting wheel **13**.

As will now be described, shaft **14** is shifted axially to selectively couple it in driving relation with any one of the resetting wheels; and is rotated to drive the thus-coupled resetting wheel; all by corresponding movement of the key **8** which has been inserted into lock **4**. This is done by means of a mechanical drive train directly connecting the lock to shaft **14**.

The lock, comprising barrel **6** and plug **5**, is mounted in a casting **18** fixed to the meter framing. The lock barrel has a depending rib **19** to give it a non-circular cross section (see FIG. 8) and is slidably received for axial movement in a correspondingly shaped non-circular hole in the left hand portion of casting **18**. The lock barrel is thus blocked against rotation but can move longitudinally. Casting **18** contains a cylindrical hole **20** in which is slidably and rotatably received a hollow cylinder **21** in whose right hand end is disposed the leftwardly extending wide flange of a gear **22**. Gear **22**, cylinder **21**, and the lock plug **8** are all rigidly clamped together by screws **23** threaded into the right hand end of the plug. Mounted fast at the left hand end of the shaft **14** is a gear **24** meshed with gear **22** in a one-to-one ratio. It will be recalled that shaft **14** is shifted lengthwise to be selectively coupled by one of drive pins **16** in driving relation with one of the resetting wheels **13**, and is rotated to operate the resetting wheels.

Gear **24** includes circular side flanges **24***a*. These are of such radial extent that the teeth of gear **22** extend into the space between said flanges in the portion of the two gears which are in mesh, whereby the flanges prevent the gears from moving apart axially. Thus, lock **4**, cylinder **21**, gears **22**, **24**, and shaft **14**, hereinafter called the "resetting unit," are all movable longitudinally as one unit. Also, it will be seen that when lock plug **5** is rotated, it will drive gear **22** which will drive gear **24** and the latter will in turn cause rotation of the resetting shaft **14**.

The normal longitudinal position of the aforedescribed resetting unit (FIG. 3) is such that it must be shifted to the right to place any of the pins **16** of shaft **14** in driving relation with the associated selected resetting wheel **13**. When the key **8** is first inserted into the lock, but before it has been turned, longitudinal shifting movement of the resetting unit and therefore of shaft **14** is prevented until the key has been partially rotated, say 45°. Also, means are provided whereby the inserted key cannot be withdrawn from the lock unless the plug is in its normal rotated position relative to the lock cylinder and also cannot be removed unless the lock unit has been shifted axially to the left to its normal home position of FIG. 3. This insures that once the resetting drive shaft has been longitudinally shifted to the right to couple any selected resetting wheel to resetting shaft **14**, for example the rightmost resetting wheel, the key cannot accidentally be pulled out of the lock when it is desired to shift the shaft to the left. It also insures that the postal clerk resetting the register always knows that the resetting mechanism is in its leftmost position when he first inserts the key into the lock.

The mechanism is prevented from being shifted longitudinally until the inserted key has first been rotated from its inserted position as follows. Cylinder **21** is provided with a number of annular grooves **25** of square cross section. A pin **26** spring biassed into the rightmost groove **25** blocks longitudinal shifting movement of cylinder **21** when plug **5** is in its home, lock angular position. However, initial rotation of the plug by key **8** through an angle of 45 degrees will bring a longitudinal slot **27** (FIGS. 4, 5) connecting grooves **25** into alignment with pin **26**, freeing the cylinder for rightward movement. Now, by pushing forwardly on the key, the entire resetting unit can be shifted longitudinally to the right to align any one of the drive pins **16** of shaft **14** in the slot **17** of its associated resetting wheel **13**. Spring urged ball detents **30** cooperable with annular detent recesses **31** of cylinder **21** yieldably maintain the resetting unit in its three shifted positions.

Thus, up to this point the resetting mechanism has been selectively adjusted to choose a particular order of the descending register **2** to be reset. Now, key **8** is rotated to turn plug **5** and drive the selected resetting wheel **13** through cylinder **21**, gear train **22**, **24**, shaft **14** and the one drive pin **16** which is coupled to the resetting wheel. On each turn of the resetting wheel, its friction shoe **13***a* will engage and drive the associated register wheel **2***a* an angular distance sufficient to change its setting by a value of "1." This is repeated by continuing to rotate key **8** in one or the other direction the number of times needed to bring the numeral wheel to the desired value. Each of the resetting wheels **13** is releasably held in its angular home position (FIGS. 9–11) by a spring detent finger **32** engageable in a recess **33** in the wheel.

The other resetting wheels can then be set in like fashion by using key **8** to longitudinally shift the resetting unit to selectively align a resetting drive pin **16** with the radial slot **17** in the desired associated resetting wheel. It will be understood that cylinder **21**, and therefore the entire resetting unit, can be shifted only when the cylinder's axial slot **27** is in line with blocking pin **26**. The resetting pins **16** are so oriented on shaft **14** that they will then be parallel with the receiving slots **17** of the resetting wheels when the latter are in normal home position. This insures that when the pins are shifted to the right or left,

they will pass freely into or through the resetting wheels **13**, without striking the latters' side faces.

Means are provided to prevent withdrawal of the key **8** from the lock **4** until the resetting unit has been returned to leftmost, home position, as follows.

The front end of the key has a tapered notch **34**. The notch is so contoured that when the key is first fully inserted into the lock, the notch's sloping side walls will hold an abutting aligned pair of separate pins **35, 36** raised to position their line of contact flush with the outer edge of cylinder **21**. Pins **35, 36** are movable vertically in holes in casting **18** and cylinder **21**, which holes are aligned when the cylinder is in leftward position (FIG. 3). When the cylinder subsequently is moved to the right during ordinal selection, the lower pin **36** will be carried along with it while the upper pin **35** will remain in its hole in casting **16**. Hence, so long as pin **36** is out of alignment with its cooperable pin **35**, it will stand in blocking relation with the right hand edge of the key notch **34** and will prevent the key from being pulled out. When the resetting unit including the lock is subsequently returned to its unoperated leftmost position of FIG. 2, lower pin **36** will once again be aligned with upper pin **35**, whereby the two are free to be cammed upwardly by the key when it is removed. When the key is removed, the lower pin **36** rests on the ledge formed by the intersection of its hole in cylinder **21** with the slot **37** for receiving the key in the cylinder (FIG. 5).

The particular order which has been selected for resetting is visually indicated, as follows. A plate **40** (FIG. 9) has display markings **41** (FIG. 3) each corresponding to a particular one of the register wheels **2***a* which can be reset. The plate includes a leftwardly extending tongue **42** which is bent downwardly at its end and is mounted fast on resetting drive shaft **14**. The ordinal display markings **41** lie beneath a cover member **43** which is opaque except for having transparent windows **44**. When the resetting mechanism has been shifted longitudinally to couple any one drive pin **15** in effective relation with its resetting wheel **13**, the associated display marking **41** will have been shifted to be visible through the window aligned with the corresponding register wheel **2***a*. The operator is thus aware at all times which order, if any, of the descending register has currently been selected for resetting.

Each descending register wheel **2***a* is detented in its various digital positions by the nose of a spring biassed detent plate **44** (FIG. 9), which also detents a corresponding order of the ascending register wheels **3***a*.

While there has been shown and described herein a preferred form and application of the invention, it will be understood that numerous modifications and adaptations can be made of the invention without departing from its principles. Accordingly, it is intended that the foregoing detailed description be only illustrative of the invention and not in any way limitative of the following claims.

We claim:

1. In a registering machine:
a register comprising a series of numeral wheels;
a series of resetting devices, each operable to reset a related one of said numeral wheels;
a resetting drive shaft for operating said resetting devices;
means for selectively coupling said drive shaft to any selected one of said resetting wheels;
a lock;
operating mechanism for operating said resetting drive shaft;
said operating mechanism including said lock.

2. The invention according to claim **1**, wherein:
each resetting wheel includes a radially projecting resetting segment engageable with the associated numeral wheel on rotation of the resetting wheel to reset the numeral wheel.

3. In a registering machine:
a register comprising a series of numeral wheels;
a series of resetting wheels, each operable to reset a related one of said numeral wheels;
a resetting drive shaft on which said resetting wheels are mounted;
means for selectively coupling said drive shaft to any selected one of said resetting wheels in response to longitudinal shifting movement of said shaft;
a lock;
mechanism for longitudinally shifting said shaft to couple it to a selected one of said resetting wheels, and for operating said shaft to operate said one resetting wheel;
said mechanism including said lock; and
means responsive to the shifting of said shaft to visually indicate to which resetting wheel said shaft is coupled.

4. In a registering machine:
a register comprising a series of numeral wheels;
a series of resetting wheels, each operable to reset a related one of said numeral wheels;
a resetting drive shaft on which said resetting wheels are mounted;
means for selectively coupling said drive shaft to any selected one of said resetting wheels in response to longitudinal shifting movement of said shaft;
a lock;
mechanism for longitudinally shifting said shaft to couple it to a selected one of said resetting wheels, and for operating said shaft to operate said one resetting wheel;
said mechanism including said lock.

5. In a registering machine:
a register comprising a series of numeral wheels on a first shaft;
a series of resetting wheels, each operable to reset a related one of said numeral wheels, said resetting wheels mounted on a second shaft;
means for selectively coupling said second shaft to any selected one of said resetting wheels in response to longitudinal shifting of said shaft;
a lock;
mechanism for longitudinally shifting said second shaft to couple it to a selected one of said resetting wheels, and for operating said second shaft to operate said one resetting wheel;
said mechanism including said lock.

6. In a registering machine,
a register comprising a series of numeral wheels;
a series of resetting wheels, each operable to reset a related one of said numeral wheels;
a resetting drive shaft on which said resetting wheels are mounted;
means for selectively coupling said drive shaft to any one of said resetting wheels in response to longitudinal shifting of said shaft;
a lock;
mechanism for longitudinally shifting said shaft to couple it to a selective one of said resetting wheels, and for operating said shaft to operate said one resetting wheel;
said mechanism including said lock;
said mechanism further including a continuously engaged coupling means to said drive shaft, whereby movement of said lock in a given direction imparts the same relative movement to said drive shaft.

7. In a postage meter:
a descending register comprising an ordinally arranged series of numeral wheels;
a series of resetting wheels, each operable to reset a related one of said numeral wheels;
a resetting drive shaft on which said resetting wheels are mounted;
means for selectively coupling said drive shaft to any

selected one of said resetting wheels in response to longitudinal shifting movement of said shaft;

a lock;

mechanism for longitudinally shifting said shaft to couple it to a selected one of said resetting wheels, and for operating said shaft to operate said one resetting wheel;

said mechanism including said lock.

8. In a postage meter:

a descending register comprising an ordinally arranged series of numeral wheels;

a series of resetting wheels, each operable to reset a related one of said numeral wheels;

a resetting drive shaft on which said resetting wheels are mounted;

means for selectively coupling said drive shaft to any selected one of said resetting wheels in response to longitudinal shifting movement of said shaft;

a key-operated lock including a barrel and a plug rotatable in said barrel and adapted to receive said key;

mechanism for longitudinally shifting said shaft to couple it to a selected one of said resetting wheels, and for operating said shaft to operate said one resetting wheel;

said mechanism including said lock.

9. The invention according to claim 8, including:

means to prevent removal of said key from said lock until said resetting shaft is returned to an inoperable position.

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