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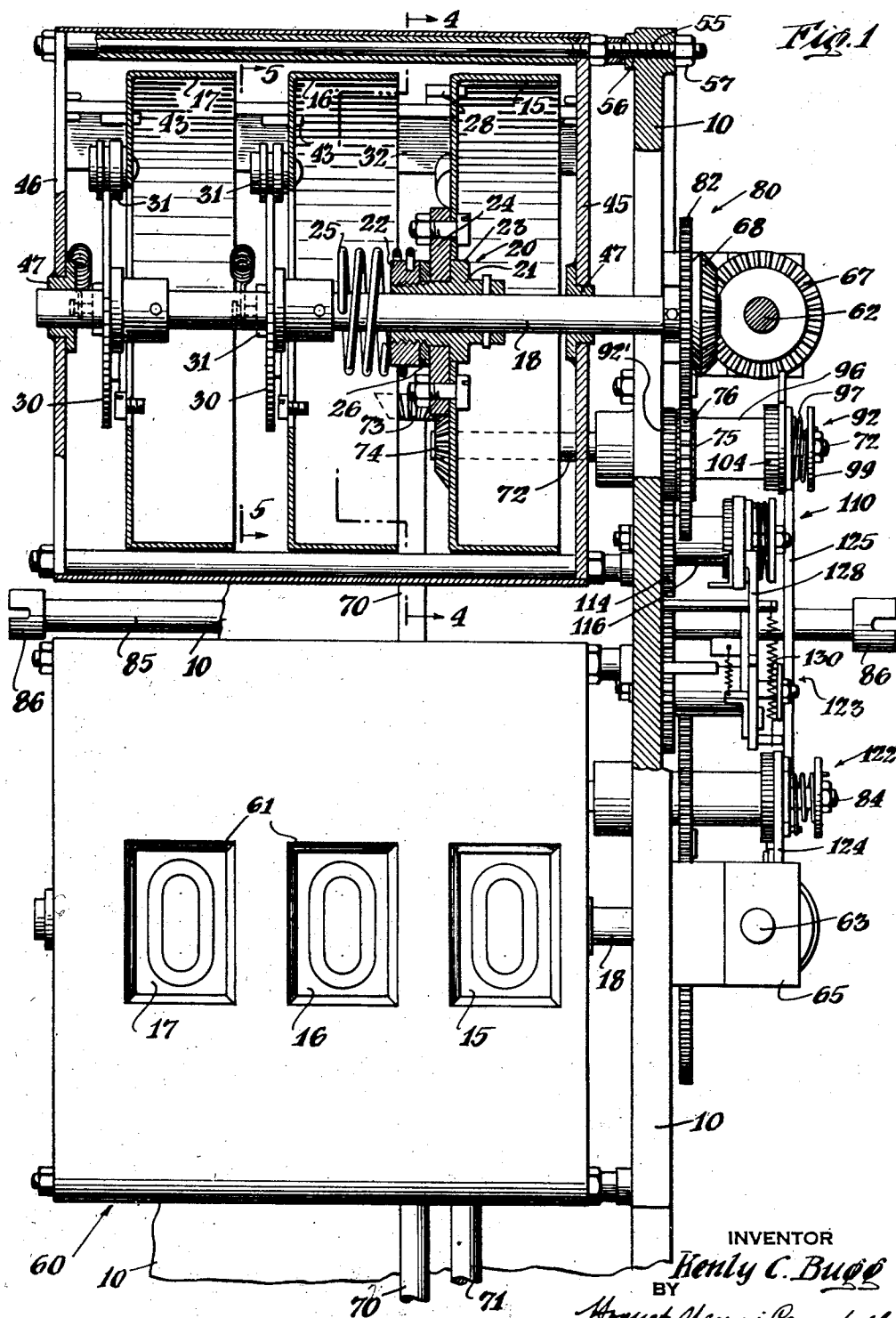
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2,298,343

RESETTING MECHANISM FOR COUNTING DEVICES

Filed Aug. 16, 1939

4 Sheets-Sheet 1



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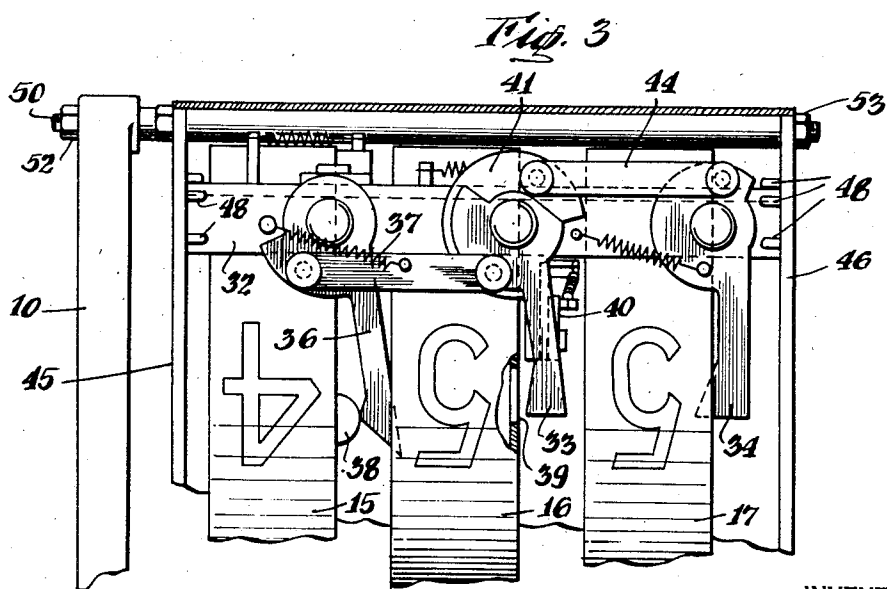
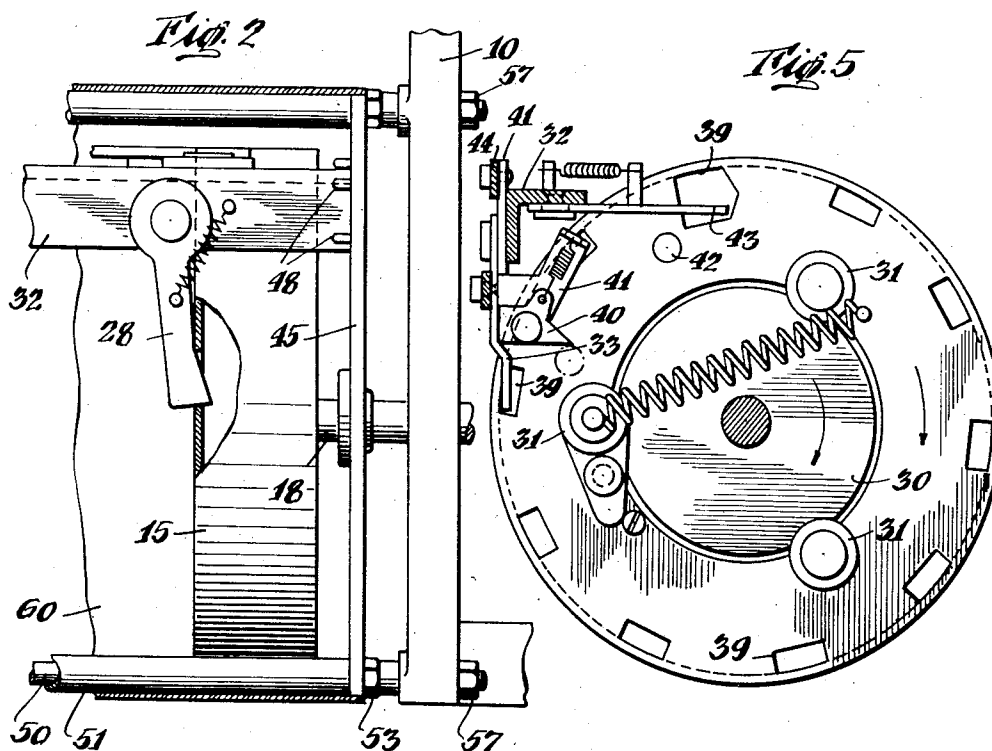
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RESETTING MECHANISM FOR COUNTING DEVICES

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4 Sheets-Sheet 2



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RESETTING MECHANISM FOR COUNTING DEVICES

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Fig. 6

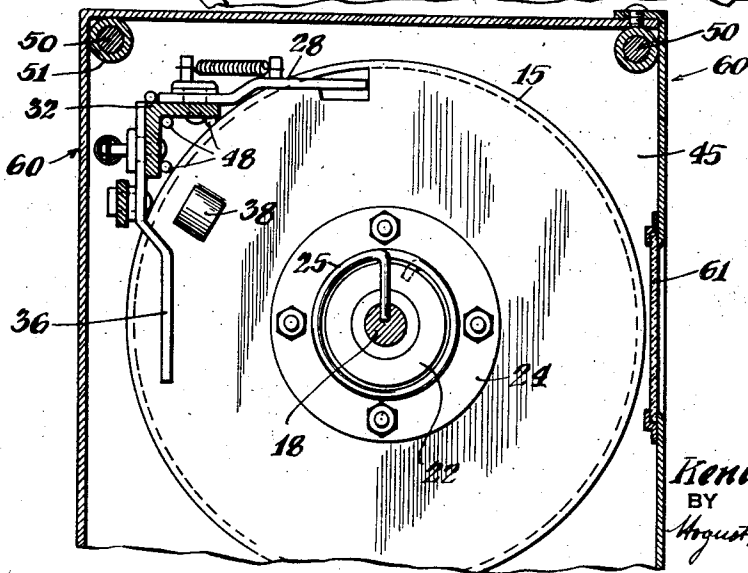
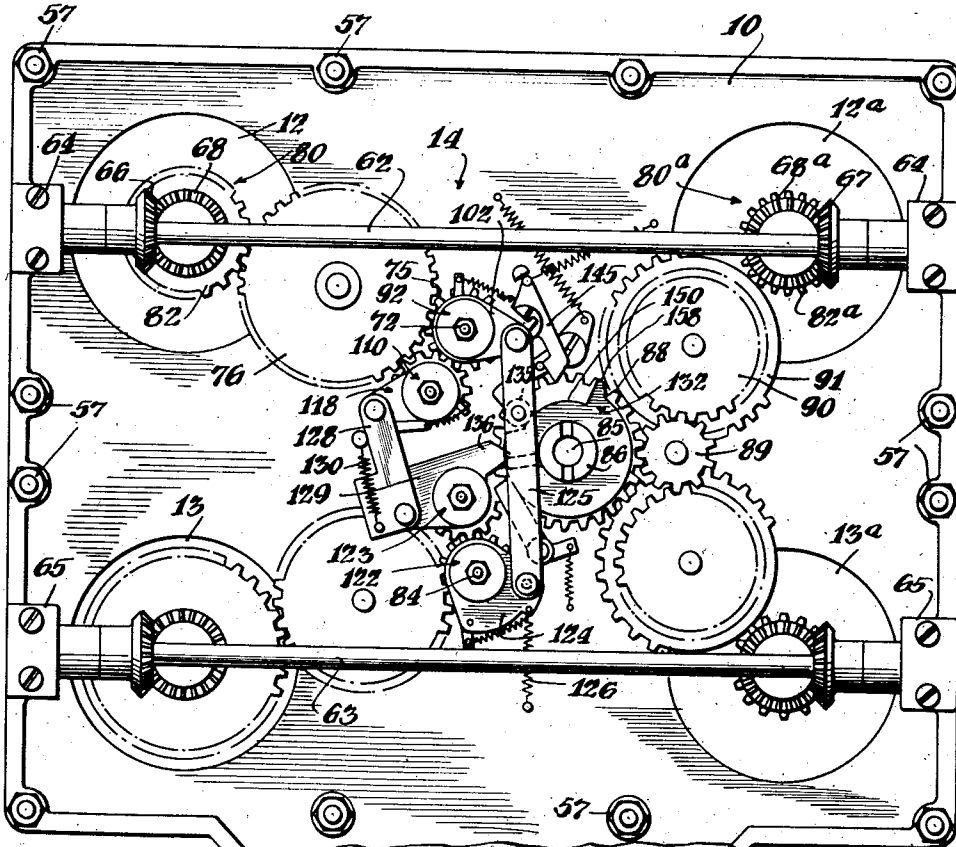


Fig. 4

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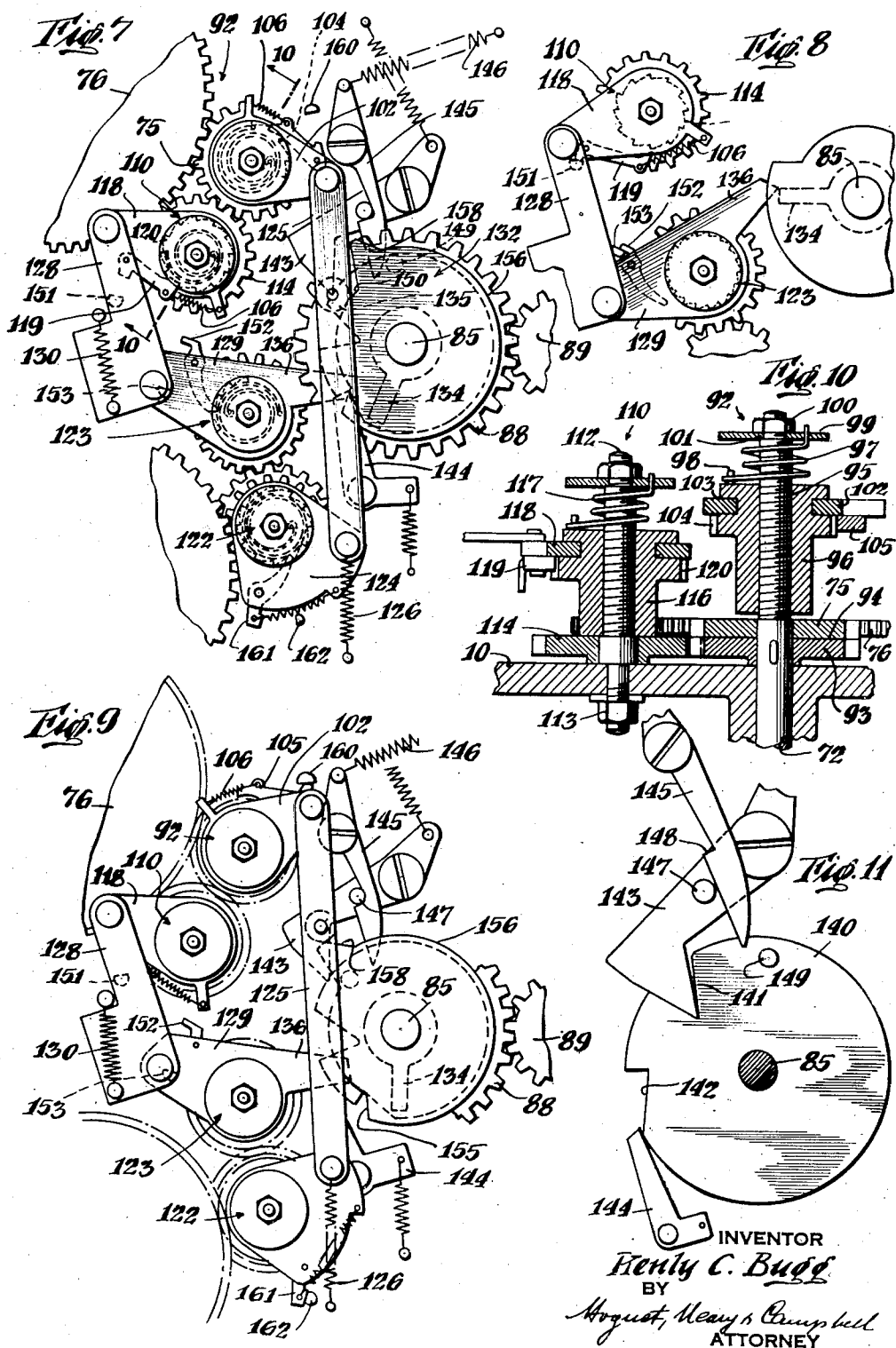
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RESETTING MECHANISM FOR COUNTING DEVICES

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UNITED STATES PATENT OFFICE

2,298,343

RESETTING MECHANISM FOR COUNTING DEVICES

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Application August 16, 1939, Serial No. 290,402

10 Claims. (Cl. 235-144)

This invention relates to resetting mechanism for counting devices such, for example, as are used in computers for gasoline dispensing pumps.

One of the principal objects of the invention is to provide an improved and accurate counting device having a compact and relatively simple resetting mechanism.

Important features of the invention are the provision of a novel clutch connection between the driving means and one or more counters; the provision of novel brake means in cooperation with the clutch connection for holding the driving means against movement during resetting; and the provision of reset driving and controlling means for actuating the clutch connections and brake means in a predetermined order.

Additional objects and features of the invention will become apparent upon consideration of the following detailed description and the appended claims when read in connection with the accompanying drawings, in which:

Figure 1 is a view in vertical elevation of the computer head with parts broken away to show the details of one of the counter units;

Figure 2 is a plan view of one of the counter units with parts broken away to illustrate the zero stop pawl arrangement for the counting elements;

Figure 3 is a rear view in elevation of the upper counter unit of Figure 1 showing the transfer mechanism thereof;

Figure 4 is a vertical cross-sectional view taken approximately on line 4-4 of Figure 1 showing the counting element of lowest order and the associated transfer mechanism;

Figure 5 is a vertical cross-sectional view taken on line 5-5 of Figure 1, showing the tens next higher counting element and the associated transfer mechanism;

Figure 6 is a view in vertical elevation on a reduced scale of the driving and resetting mechanism for the several counters of a computing device;

Figure 7 is a fragmentary view in vertical elevation of the driving and resetting mechanism in a pullback position;

Figure 8 is a fragmentary view in elevation showing the brake device in brake actuating position;

Figure 9 is a fragmentary view in side elevation of the driving and resetting mechanism near the end of a resetting operation with the clutch connections in clutch engaging position;

Figure 10 is a sectional view taken on line 5-5

10-10 of Figure 7 to show the details of the clutch connection and brake device;

Figure 11 is a view in side elevation of the means for controlling the cyclic operation of the reset mechanism.

Referring to Figures 1 and 6 of the drawings, a computer head is illustrated embodying the features of the present invention which is provided with a plurality of counters adapted to indicate the amount and cost of a substance or units being counted. For example, the computer head comprises a supporting frame 10 upon which are mounted counter units 12 and 12a, 13 and 13a (Fig. 6) and a driving and resetting mechanism 14. The upper counter units 12 and 12a are provided with appropriate characters in the order of units, tens and hundreds representing the cost of the substance being counted, while the lower counter units 13 and 13a are provided with appropriate characters in the same order representing the amount, such as volume, length, number, etc., depending upon the character of the substance being counted. Disposed between the four counter units is a form of my improved resetting mechanism which is adapted to reset all four counters simultaneously.

The construction and assembling features of the particular counter units illustrated with this invention are the subject matters of my co-pending applications—Serial No. 84,657, filed June 11, 1936; Serial No. 180,526, filed December 18, 1937, and Serial No. 290,401, filed August 16, 1939.

Since all four counter units are similarly constructed, counter unit 12 only will be described in sufficient detail to give an understanding of the counter mechanism adaptable for use with the present invention.

Referring to Figures 1 to 5 of the drawings, the counting mechanism comprises a bank of three counting elements or numeral wheels 15, 16 and 17 in the order of units, tens and hundreds, respectively. The numeral wheels are mounted on a shaft 18 to receive driving movement therefrom during both counting and resetting operations. The units wheel is frictionally supported on the shaft 18 by a clutch 20 which is adapted to provide an effective driving connection for the units wheel during movement of the shaft in a counting direction and a releasable driving connection for the units wheel during movement of the shaft in a reverse or resetting direction.

The clutch 20 comprises a flanged sleeve-like member 21 carried by the shaft 18 and a member 22 threadably mounted on the sleeve portion

of the member 21 for rotary movement relative to the shaft in directions toward and away from a flange 23 on member 21. The units wheel 15 is provided with a frictionally engageable hub 24 interposed between the member 22 and the flange 23. A spring 25 coiled about the shaft 18 with one end thereof secured to the shaft and the other end secured to the member 22 is adapted to urge the member 22 in rotary movement toward the flange 23 to effect a driving connection between the hub 24 and the shaft 18 during both counting and resetting movements. Interposed between member 22 and the hub 24 is a floating washer 26 which serves to give the clutch a sensitive releasing characteristic during resetting movement.

Upon initiation of a counting movement, the rotation of shaft 18 is transmitted to the units wheel through the coactive clutching action of members 21 and 22. The spring 25 tends to rotate the clutch member 22 with increasing force to urge the washer 26 into gripping relation with the hub of the units wheel to thereby provide an effective driving connection between the units wheel and shaft 18. During resetting operations, the spring 25 tends to retract the clutch member 22, but not sufficient to release the units wheel until the wheel engages a zero stop pawl 28. Since the floating washer 26 provides an additional frictional clutch surface, the clutch member 22 is rendered more sensitive to releasing forces.

The tens and hundreds wheels 16 and 17 are each mounted in spaced concentric relation on the shaft 18 and supported by a disc 30. They are frictionally driven through coaction of the disc 30 and a series of rollers 31, as indicated in Figures 1 and 5. The transmission of movement from the shaft 18 to the tens and hundreds wheels during a counting operation is controlled by a transfer mechanism mounted on a longitudinal angle member 32. The tens and hundreds wheels are normally held against forward counting movement by pawls 33 and 34 (Figure 3) pivotally mounted on the member 32. Movement of the pawl 33 is controlled by an arm 36, which is also pivotally mounted on the member 32 and biased by a spring 37 to engage a surface of the units wheel. A cam lug 38 is provided on the surface of the units wheel to actuate the arm 36 and thereby pivot the pawl 33 clear of the tens wheel. The tens wheel being in frictional driving relation with the shaft 18, the release thereof by the pawl 33 permits the shaft to move the tens wheel forward with the units wheel. The cam 38 is such, however, as to release the pawl shortly after the pawl disengages the tens wheel so that after the tens wheel has moved one step the pawl is adapted to reengage one of a series of openings 39 in the surface of the tens wheel to hold the tens wheel until transfer movement is again required.

The transfer control between the tens and hundreds wheels is similar to that between the units and tens wheels, except that an arm 40 pivotally mounted on a member 41 which is connected by a link 44 to pawl 34 (Figure 5) is adapted to be actuated by a cam knob 42 to a position overlapping the pawl 33 at the end of the ninth step of the tens wheel so that upon the tenth step of the tens wheel the pawl 34 of the hundreds wheel is actuated together with pawl 33 to simultaneously release the tens and hundreds wheels.

The tens and hundreds wheels are provided with zero stop pawls 43 similar to the units wheel

zero stop pawl 28. Upon movement of the shaft 18 in a reverse or resetting direction, all three numeral wheels are adapted to be rotated backwards until they are engaged by their respective zero stop pawls. Upon reaching zero position, each numeral wheel is held against further backward rotation during the remaining portion of the resetting cycle.

The transfer control mechanism of the counter assembly which is supported on the angle bar 32 independent of the shaft 18 is held in operative position by mounting the member 32 between a pair of end plates 45 and 46. The end plates are provided with bearings 47 for rotatably supporting the shaft 18. The angle member 32 is held in place between the end plates by a plurality of positioning lugs 48. Tie rods 50 with spacer sleeves 51 are provided at the four corners of the end plates 45 and 46 to secure the plates in spaced relation, certain of the tie rods extending beyond the plate 45 to provide securing means for mounting the counter assembly as a unit upon the frame of a computer. The tie rods are provided with nuts 52 and 53 to clamp the end plates in position against the spacer sleeves 51 and the angle member 32. The extended portions 55 of the tie rods 50 (see Figure 1) are adapted to protrude through openings 56 formed in the frame 10 so that nuts 57 may be applied for securing the counter assembly upon the frame 10.

Each of the counter units is provided with a casing 60 to minimize the infiltration of dust into the working parts of counter assembly. The casing which includes the end plates 45 and 46 is provided with appropriately spaced windows 61 through which the numeral wheels may be viewed. Since the drive shaft to the numeral wheels is the only moving part which extends through the casing it will be apparent that the casing provides a substantially dustproof enclosure for the counter unit.

It is important to note that the counting elements of each counter are adapted to be driven from the shaft 18 during both counting and resetting operations, the shaft being rotated in a reverse direction for resetting. The driving and resetting mechanism of the present invention provides connections for the counters whereby each counter may be independently removed or replaced without altering or disassembling any other part of the computer mechanism.

Having described a representative type of mechanism to which my invention may be applied, I shall now describe that form of the resetting mechanism which embodies the novel features of my invention.

Referring to Figures 1 and 6 of the drawings, it will be noted that the shaft 18 of each counter unit is mounted at right angles to the frame 10 of the computing device. The corresponding counters 12, 12a and 13, 13a are interconnected for corresponding movement by shafts 62 and 63, mounted in bearings 64 and 65, respectively.

Referring to the upper counter units 12 and 12a the shaft 62 intersects at right angles the center line of the shafts 18 of the counter units. Bevel gears 66 and 67 are provided on the shaft 62 to mesh with bevel gears 68 and 68a of counters 12 and 12a, respectively. The lower shaft 63 is provided with a similar bevel gear connection for transmission of motion to counters 13 and 13a.

The upper and lower counter units are driven independently of each other by drive shafts 70 and 71. Where the computer is used in connec-

tion with a dispensing pump including a metering device, the lower or volume indicating counters 13 and 13a are adapted to be driven directly from the metering device. The upper counters which are adapted to indicate the cost of the liquid being dispensed are driven from the metering device through a price variator mechanism (not shown) whereby the cost indications may be correlated with respect to the price indicated by the price variator mechanism.

A clutch shaft 72 is driven from the drive shaft 70 through bevel gears 73 and 74. The driving movement is transmitted from the clutch shaft 72 to the upper counter units through a clutch gear 75, an idler gear 76 and a gear device 80. The gear device 80 of counter 12 includes the bevel gear 68 and a spur gear 82. The gear 82 meshes with the idler gear 76 whereby movement in a counting direction is transmitted to the shaft 18 of counter 12 and to the corresponding shaft of counter 12a by transmission through bevel gears 68 and 66, the shaft 62 and bevel gears 67 and 68a. The drive during a counting operation to the lower counters 13 and 13a from a clutch shaft 84 is identical with that described in connection with counters 12 and 12a, the clutch shaft 84 being driven from drive shaft 71 by a pair of bevel gears similar to gears 73 and 74.

For the purpose of simultaneously resetting the several counters, a reset shaft 85 is shown in Figures 1 and 6, rotatably mounted in the frame 10 with couplings 86 extending outwardly of the frame for engagement with a manually actuable handle. The reset shaft is provided with a gear 88 which meshes with an idler gear 89 (Figures 6 and 7). Interposed between the idler gear 89 and the gear device 80a of counter unit 12a is a gear 90 to which is secured a mutilated gear 91. During a resetting operation the mutilated gear is adapted meshingly to engage the gear 82a of the gear device 80a whereby counters 12 and 12a are driven in a reverse direction toward zero position, the motion being transmitted to the counter 12 from counter 12a backward through bevel gears 68a, 67, the shaft 62 and bevel gears 66 and 68. The resetting drive to counter units 13 and 13a is identical with the drive to 12 and 12a just described.

The clutch connection 92 for transmitting movement between the clutch shaft 72 and idler gear 76 is shown in detail in Figure 10. Keyed to the shaft 72 is a gear 93 which provides a friction surface 94 adapted to engage the clutch gear 75 which is rotatably mounted on the shaft 72. The shaft 72 is threaded at 95 to a point adjacent gear 75. A clutch block 96 is threadably mounted on the threaded portion 95 for rotary movement relative to shaft 72 in directions toward and away from the keyed gear 93 to grip and release the clutch gear 75. The clutch block 96 is biased for movement toward the gear 93 by a spring 97 coiled about the shaft 72 with one end connected to the block 96 at 98 and the other end to a disc 99 rotatively adjustable and secured to the shaft 72 against shoulder 101 by a nut 100. The actuation of the clutch block 96 is controlled by the resetting mechanism through an arm 102 which is rotatably mounted in an annular recess 103 formed in the block 96. The surface of the block 96 adjacent the arm 102 is provided with ratchet teeth 104. A pawl 105 pivotally mounted on the arm 102 and biased by a spring 106 (Figure 7) to engage the ratchet teeth 104 is adapted to retract the block 96 and

thereby release the gear 75 when the arm 102 is moved counterclockwise, as viewed in Figure 6.

For the purpose of holding the drive shaft against movement during resetting operations a brake 110 is provided (Figures 1, 7, 8, 9 and 10). The brake includes a stationary shaft in the form of a double-headed bolt 112 rigidly secured to the frame 10 by a nut 113 in spaced parallel relation to shaft 72. A gear 114 is rotatably mounted on the bolt 112 in friction engaging relation with the frame 10 and in mesh with the gear 93 which is secured for rotation with shaft 72. Threadably mounted on the bolt 112 is a brake block 116 similar to the clutch block 96. The brake block 116 is biased for rotary movement toward the gear 114 by a spring 117 to frictionally grip the gear 114 against the frame 10, thereby holding the shaft 72 against movement. The brake block 116 is provided with an arm 118 which carries a pawl 119 (Figure 7) adapted to engage ratchet teeth 120 for the purpose of retracting the brake block near the end of a resetting operation to thereby release the shaft 72 for normal counting operations.

The lower counter units 13 and 13a are provided with a clutch 122 and a brake device 123 which are of substantially the same construction as clutch 92 and brake device 110. The arms 102 and 124 of the two clutches 92 and 122 are interconnected by a link 125 whereby the clutches are adapted to be actuated simultaneously. A spring 126 is connected to the link 125 to bias the clutch arms 102 and 124 in a clockwise direction, as viewed in Figures 6, 7 and 9.

The brake devices 110 and 123 are also arranged for simultaneous operation, the brake arms 118 and 129 being connected by a link 128, biased by a spring 130 in a clockwise direction, as viewed in Figures 6, 7 and 9.

The predetermined order of actuating the links 125 and 128 is controlled by a cam disc 132 and a cam lug 134 carried by the reset shaft 85. The link 125 is provided with a roller 135 which engages the surface of the cam disc 132. The arm 129 of the brake device 123 is provided with a finger 136 which is adapted to be engaged by the lug 134.

The cyclic movement of the reset shaft 85 is controlled by a notched disc 140 (see Figures 9 and 11). Cooperating with the notches 141 and 142 of the disk 140 are zero stop pawl 143 and pullback limiting pawl 144. Pivotally mounted on the frame 10 adjacent the zero stop pawl 143 is a latch 145 biased by a spring 146 to engage a pin 147 on the zero stop pawl 143. Figure 11 illustrates the position of zero stop pawl 143 in engagement with the notch 141 at the end of a resetting operation, the pawl operating to prevent continued movement of a shaft 85 in a clockwise direction. To initiate a new resetting operation the shaft 85 must first be rotated in a counterclockwise direction, as viewed in Figures 9, and 11, until the pawl 144 engages the notch 142. This pullback movement operates to dislodge the pawl 143 from the notch 141. The resulting clockwise movement of the pawl 143 raises the pin 147 sufficiently for the shoulder 148 of the latch 145 to slide beneath the pin thereby retaining the pawl 143 free of the notch 141, a position shown in Figures 7 and 9. After the reset shaft 85 has been rotated counterclockwise throughout the extent of a pullback movement, the shaft 85 may then be rotated in a clockwise direction through one and a fraction rotations until the latch 145 has been

tripped by the pin 149 to permit the zero stop pawl 143 to enter notch 141 and terminate the resetting operation.

It will thus be understood that the zero resetting mechanism is first given a slight pullback movement to withdraw the zero stop pawl and then a forward movement during which the shafts 18 of the several counters are driven in a reverse direction to return the counting elements to zero position, the stop pawl being released for movement to stopping position near the end of the resetting operation.

A cyclic operation of the driving and resetting mechanism is described herebelow by setting forth the relative positioning of parts at certain points during a resetting operation. The counter units 12 and 12a only are referred to in this description of operation for the sake of brevity.

(1) Figure 6 illustrates the position of the resetting mechanism at the termination of a resetting operation. The clutch block 96 is in biased position, having been released from the pawl 105 to provide an effective driving connection between the shaft 72 and the clutch gear 75. The brake device 110 is in retracted position releasing the gear 114, whereby shaft 72 is capable of being driven by a source of power such as a meter or the like.

(2) During the pullback movement of the reset shaft to the position indicated in Figure 7, where pawl 144 engages the notch 142, the zero stop pawl is dislodged from the notch 141 and latched in raised position by latch 145. The right hand side of the latch 145 (Fig. 11) is engaged by the pin 149 during the pullback movement to urge the shoulder 148 of the latch beneath the lug 147 on the zero stop pawl 143. The pullback movement also causes the cam lug 134 to be withdrawn from the finger 136, thus permitting the spring 130 to move brake arms 118 and 129 clockwise from the position indicated in Figure 6 to that indicated in Figure 7. The pawl 119 of the brake device 110 rides over the ratchet teeth of the brake block during this movement. The roller 135 remains on the surface 150 of the cam 132 throughout the pullback movement, permitting the link 125 to remain in fixed position.

(3) Initial clockwise movement of the resetting shaft 85 causes the cam lug 134 to engage the finger 136 to actuate brake arms 118 and 129 in a counterclockwise direction, whereupon the pawl 119 rotates the brake block 116 to an extreme retracted position, that is, until the pawl 119 engages an abutment 151 (and pawl 152 of brake 122 engages an abutment 153), whereupon the ratchet teeth 120 are disengaged and the brake block 116 released for rotation by spring 117 to locking engagement with gear 114. The extreme or releasing position for the brake arms 118 and 129 is illustrated in Figure 8. By this actuation of the brake device 110, the drive shaft 72 is held against movement during resetting of the counting elements.

(4) By continued movement of the reset shaft in a clockwise direction the cam lug 134 is caused to disengage the finger 136 whereby the brake arms 118 and 129 assume the positions illustrated in Figures 7 and 9 by action of spring 130. At about this point in the movement of the reset shaft, the inclined surface 155 of cam 132 engages the roller 135 to actuate the link 125, rotating the clutch arms 102 and 124 counterclockwise. This movement of arm 102 causes the pawl 105 to

engage the ratchet teeth 104, retracting the block 96 to release the clutch gear 75. With the roller 135 raised to the cam surface 156, the reset mechanism is then in a position to initiate resetting movement of the counter shafts 18.

(5) Immediately following the movement of the roller 135 onto the surface 156, the mutilated gear 91 is adapted to engage the teeth of gear 82a. Continued rotation of the reset shaft causes the mutilated gear 91 to drive gear 82a to reset counter 12a backwards to zero position, the resetting movement being transmitted from counter 12a to counter 12 through bevel gears 68a and 67, the shaft 62, and bevel gears 66 and 68. The resetting movement is transmitted to counters 13 and 13a by a similar driving mechanism.

The ratio between the mutilated gear and the gear 82a is such that the mutilated gear is adapted to rotate the gear 82a and therefore shafts 18 about one and one-half rotations during a resetting movement.

(6) The mutilated gears disengage the gears of the counters just before the lip portion 158 of cam 132 engages the roller 135. The lip portion 158 is adapted to raise the roller 135 to move the clutch arms 102 and 124 to their extreme raised position (see Figure 9). Upon movement of arm 102 to this position, pawl 105 engages an abutment 160, releasing the clutch block 96 for movement by the spring 97 to clutch engaging relation with gear 75. The pawl 161 associated with arm 124 engages an abutment 162 at the same time pawl 105 engages abutment 160. When the lip 158 disengages the roller 135 the link 125 is caused to rotate clutch arms 102 and 124 clockwise by spring 126 to the position illustrated in Figure 6.

(7) A continued rotation of the shaft 85 causes the cam lug 134 to engage the finger 136, rotating the brake arms 118 and 129 in a counterclockwise direction. This movement retracts the brake block 116 by engagement of pawl 119 with ratchet teeth 120, whereby the gear 114 is released, thus unlocking the drive shaft 72 for normal operation. The arms 118 and 129 are retained in retracting position, as shown in Figure 6, by continued engagement of the cam lug 134 with finger 136. Just prior to the completion of the resetting movement, the pin 149 is adapted to engage and trip latch 145 to release the zero stop pawl 143 to terminate the resetting operation with the mechanism in the position illustrated in Figure 6.

From the foregoing it will be clear that the counters 12, 12a and 13, 13a are reset to zero position by a movement which holds the driving means against movement and releases the counters for movement independent of the driving means. The mutilated gears pick up the drives to the several counter units to reset the numeral wheels backwards to zero position where they are engaged by zero stop pawls, the frictional connection between the numeral wheels and their respective drive shaft 18 permitting the numeral wheels to be held in zero position during the remainder of the resetting movement. After the shafts of the several counters have been rotated through approximately one and one-half rotations to insure complete resetting of the numeral wheels, the mutilated gears become disengaged, the clutch connection actuated to reconnect the counters to the driving means and the brake devices actuated to cause the release of the driving means. Thus, the counters are reset to zero position and prepared for a new counting operation.

While I have shown only one form of resetting

mechanism, it is recognized that many modifications may be made without departing from the spirit of my invention. It should therefore be understood that the construction herein illustrated and described is intended to be illustrative of the invention and not to limit the scope of the claims.

I claim:

1. The combination with a counter and a shaft operable to drive said counter in opposite directions to perform counting and resetting operations; of driving means for actuating said shaft in a counting direction, resetting means for actuating said shaft in a resetting direction, means operative upon initiation of a resetting operation to hold said driving means against movement and release said shaft for movement independently of said driving means, and means operative after the counter reaches zero position to disconnect said holding means and to connect said driving means and said shaft.
2. The combination with a counter and a shaft operable to drive said counter in opposite directions to perform counting and resetting operations; of driving means for actuating said shaft in a counting direction, a disconnectible connection between said shaft and said driving means, resetting means for actuating said shaft in a resetting direction, a pair of devices associated with said driving and resetting means, one of said devices being arranged to hold said driving means against movement during resetting and the other of said devices being arranged to effect release of the connection between said shaft from said driving means upon initiation of a resetting operation and to reestablish the connection between said shaft and said driving means after the counter reaches zero position.
3. The combination with a counter and a shaft operable to drive said counter to perform counting and resetting operations; of driving means for actuating said shaft to perform a counting operation, resetting means including a mutilated gear for actuating said shaft to perform a resetting operation, means including a clutch associated with said resetting means to disconnect said shaft from said driving means upon initiation of a resetting operation, but prior to the establishment of a driving connection between said shaft and said mutilated gear, and means for actuating said clutch after said shaft is released from driving connection with said mutilated gear to reestablish the connection between said shaft and said driving means.
4. The combination with a counter and a shaft operable to drive said counter to perform counting and resetting operations; of driving means including a gear for actuating said shaft to perform a counting operation, resetting means including a mutilated gear adapted to mesh with said gear to actuate said shaft to perform a resetting operation, means associated with said resetting means to disconnect said gear from said driving means upon initiation of a resetting operation, but prior to meshing engagement by said mutilated gear, and means operative after disengagement of said gear by said mutilated gear to reestablish the connection between said gear and said driving means.
5. The combination of a counter, a drive shaft, means for connecting said drive shaft to said counter to perform a counting operation, means for resetting said counter to zero position, said connecting means comprising a member fixed to said drive shaft, a clutching member threadably mounted on said shaft for rotary movement relative to said shaft in directions toward and away from said fixed member and an element rotatably mounted on said shaft between said members, said element being operatively connected to said counter to transmit movement thereto when gripped by action of said clutch member, and means associated with said resetting means for moving said clutch member to clutch releasing position upon initiation of a resetting operation and to clutching position upon termination of the resetting operation.
6. The combination of a counter, a drive shaft, means for connecting said drive shaft to said counter to perform a counting operation, means for resetting said counter to zero position, said connecting means comprising a member fixed to said drive shaft, a clutch member threadably mounted on said shaft for rotary movement relative to said shaft in directions toward and away from said fixed member and an element rotatably mounted on said shaft between said members, said element being operatively connected to said counter to transmit movement thereto when gripped by action of said clutch member, means operative to bias said clutch member into clutching engagement with said element, and means including pawl and ratchet means associated with said resetting means to retract said clutch member upon initiation of a resetting operation and to release said clutch member for clutching engagement upon termination of the resetting operation.
7. A device comprising a pair of counters arranged in parallel spaced relation, each of said counters being provided with a spur gear and a bevel gear, a shaft disposed at right angles to the axes of said counters and carrying bevel gears adapted to mesh with the bevel gears of said counters to thereby transmit movement from one counter to the other, driving means operatively connected to the spur gear of one of said counters, resetting means including a mutilated gear adapted to mesh with the spur gear of the other of said counters, and means operative upon the initiation of a resetting operation and before meshing engagement of said mutilated gear to disconnect the driving means from the spur gear of said one counter.
8. A device comprising a pair of counters arranged in parallel spaced relation, each of said counters being provided with a spur gear and a bevel gear, a shaft disposed at right angles to the axes of said counters and carrying bevel gears adapted to mesh with the bevel gears of said counters to thereby transmit movement from one counter to the other, driving means including a driving gear in mesh with the spur gear of one of said counters and a disconnectible connection for said driving gear, resetting means including a mutilated gear adapted to mesh with the spur gear of the other of said counters, and a pair of devices, one of said devices being operative to hold said driving means against movement during resetting and the other of said devices being operative to disconnect the driving gear from said driving means prior to the driving engagement by said mutilated gear and to reestablish the connection between the driving gear and said driving means after the disengagement by said mutilated gear.
9. In a counting device, the combination of a reset shaft, a disc driven by said shaft, a shoulder on said disc, a zero stop pawl engageable by the shoulder to stop said shaft at the end of a

resetting movement, said disc having a surface adapted to force the pawl radially thereof during movement of the disc preparatory to a resetting movement, a latch adapted to engage and retain said pawl when it is moved radially so that the pawl will clear said shoulder during initiation of a resetting movement, and an element carried by said disc to trip said latch and thereby free said pawl prior to the end of the resetting movement preparatory to engagement by said shoulder.

10. In a counting device, the combination of a reset shaft adapted to perform a resetting operation during a single rotation thereof, a notched

disc carried by said shaft, a zero stop pawl engageable by a notch in said disc to stop said shaft at the end of a resetting movement, a latch adapted to engage and retain said pawl clear of said notch upon initiation of a resetting operation, an element carried by said disc adapted to trip said latch to release said pawl prior to the end of a resetting movement, the disc having a surface adapted to dislodge from said notch the zero stop pawl by a pullback rotation of said shaft, and said element being operable during a pullback movement to urge said latch into pawl retaining engagement.

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