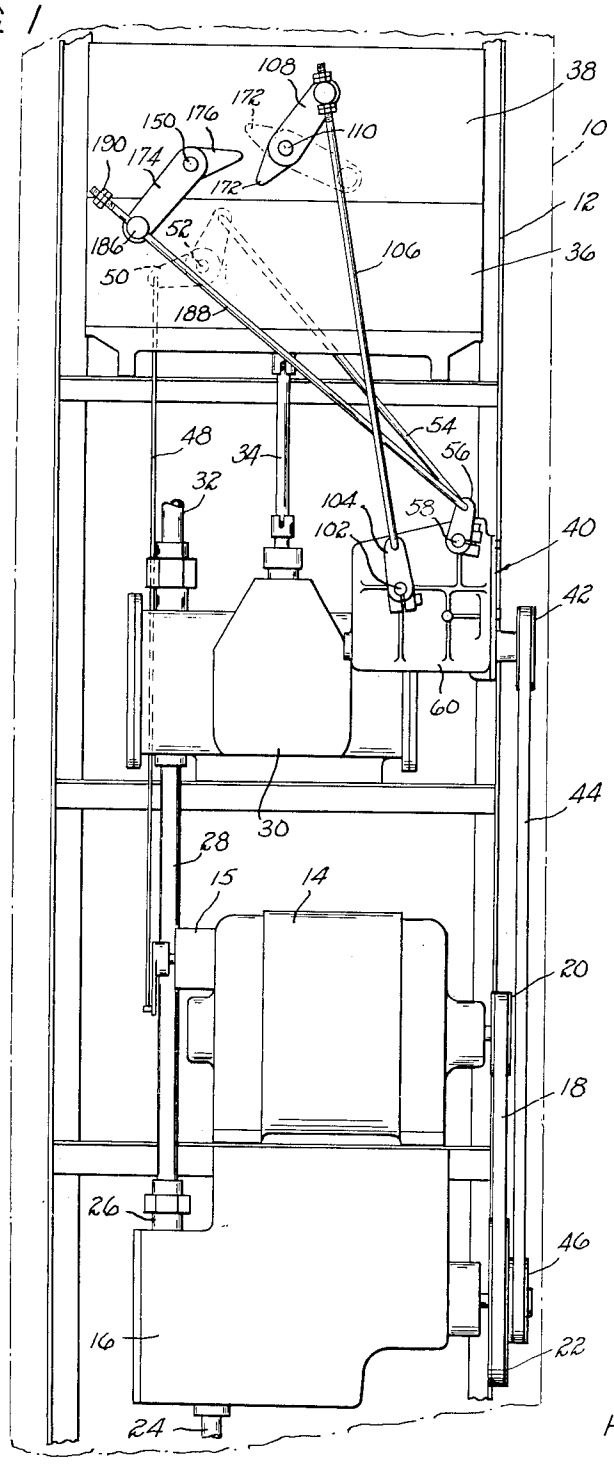
March 27, 1956 H. N. BLISS 2,739,736

RESET MECHANISM FOR REGISTERS

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FIG. 1



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RESET MECHANISM FOR REGISTERS

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FIG. 2

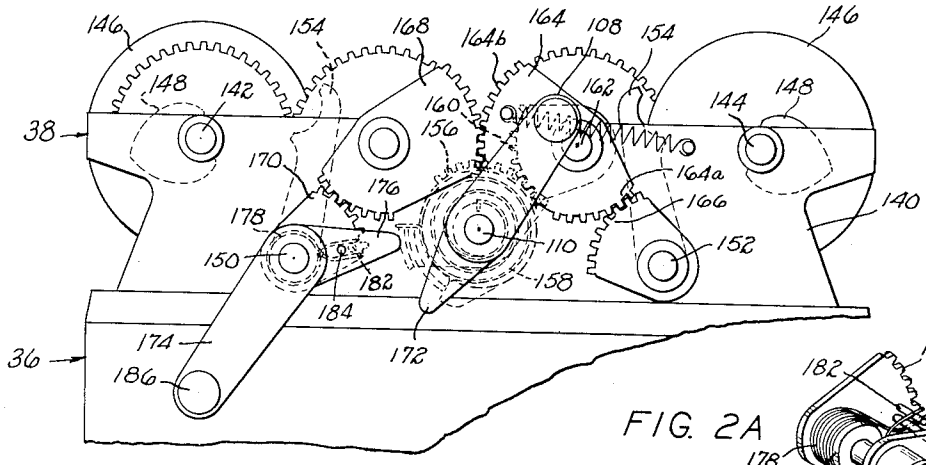


FIG. 2A

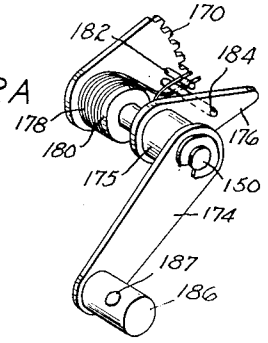
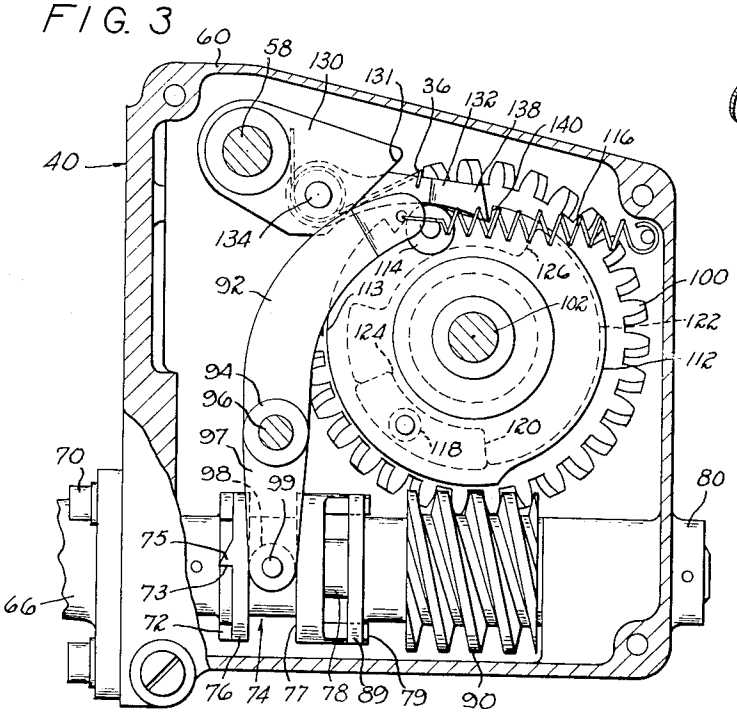


FIG. 3



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RESET MECHANISM FOR REGISTERS

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FIG. 4

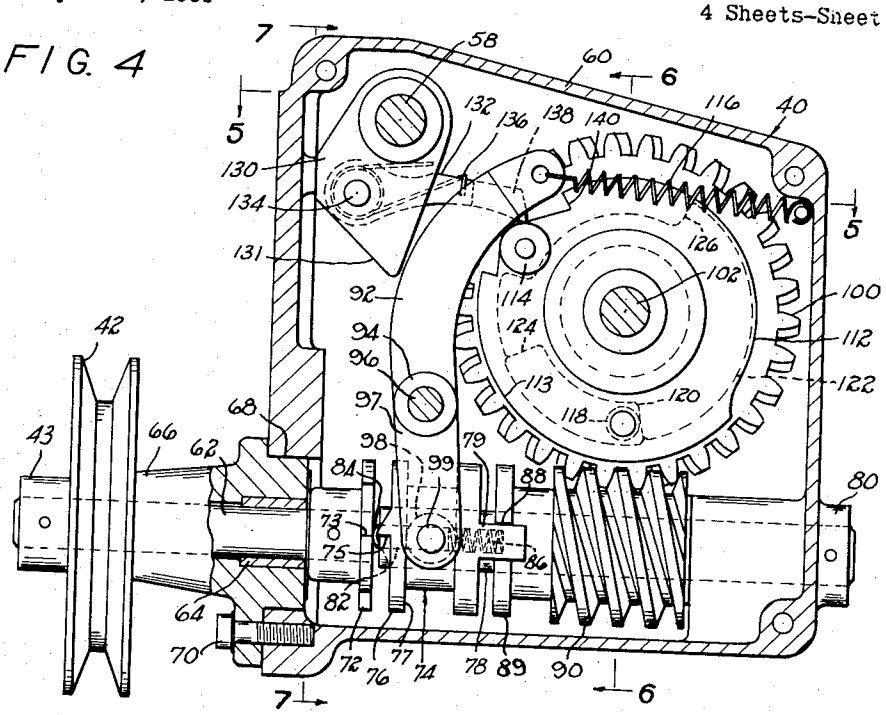
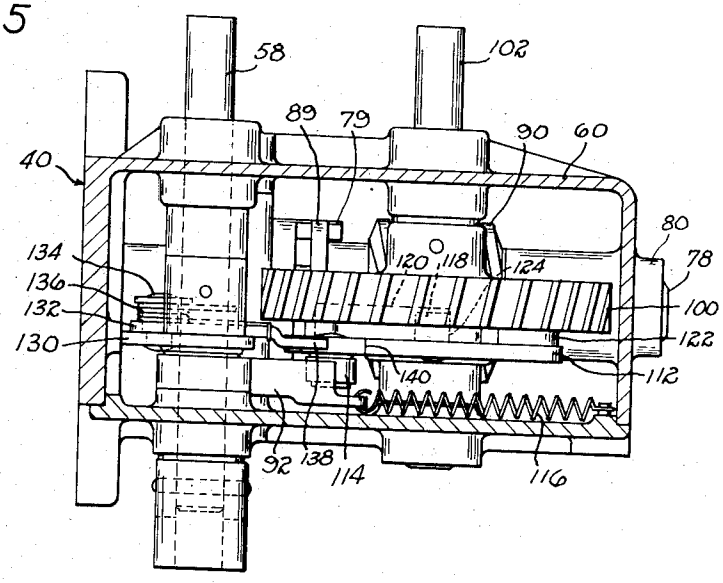


FIG. 5



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RESET MECHANISM FOR REGISTERS

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FIG. 6

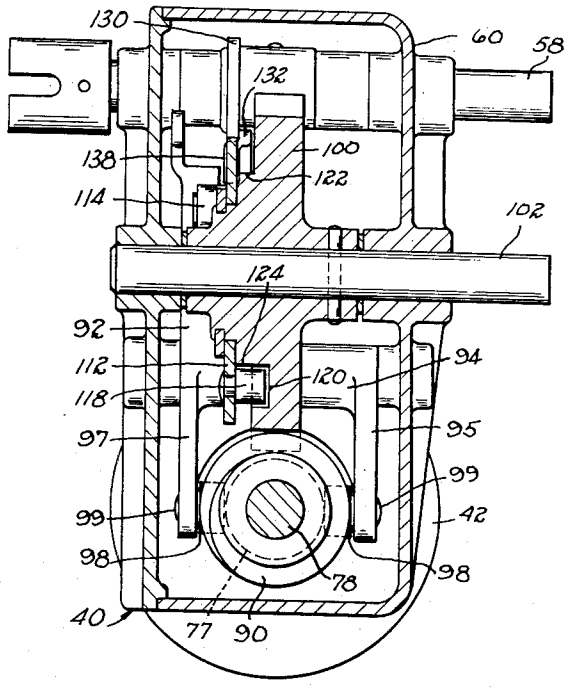
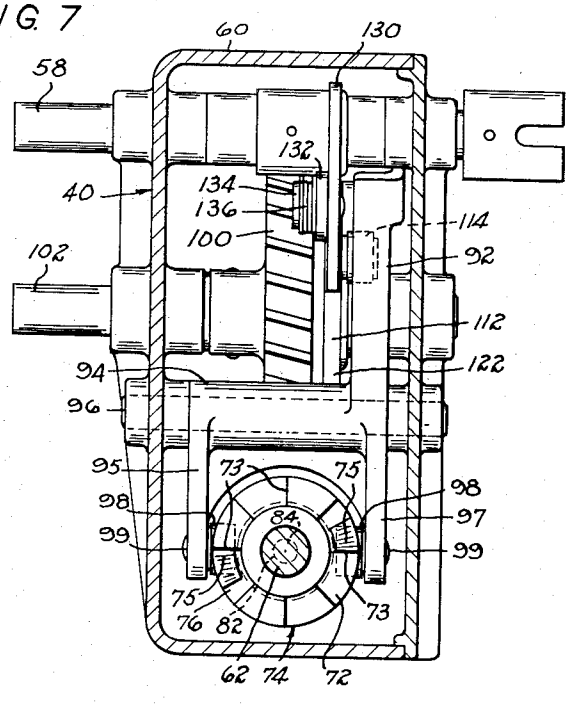


FIG. 7



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RESET MECHANISM FOR REGISTERS

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Application September 21, 1951, Serial No. 247,622

17 Claims. (Cl. 222—33)

The present invention relates generally to liquid dispensing apparatus and, more particularly, to a mechanism for connection to the reset shaft of the register and to the pump motor of the dispensing apparatus to provide for automatic resetting of the register whenever operation of the pump motor is initiated. Although not limited thereto, the mechanism of the present invention is particularly useful for installation in dispensing apparatus in which the register is reset by oscillating movement of the reset shaft.

The object of the present invention is to provide a mechanism for use in gasoline dispensing apparatus which may be driven by the pump motor and which in a simple and efficient manner will actuate the resetting mechanism of the counter or register whenever the pump motor is turned on to initiate a dispensing operation, which will operate sufficiently rapidly to insure that the resetting operation will not interfere with dispensing which will automatically disengage upon completion of reset and yet will be free of control of the operator or interlocked so that resetting must be carried out to completion when initiated, and which, if desired, may be so arranged that it will shut off if there is interference with the resetting operation.

Other objects will be in part obvious, and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a diagrammatic and fragmentary side view of a gasoline dispensing apparatus in which the reset mechanism of the present invention has been incorporated;

Fig. 2 is a fragmentary side view of the register or counter of the dispensing apparatus;

Fig. 2A is a perspective view of the interference arm mounted thereon;

Fig. 3 is a view, partially in cross section, of the resetting mechanism showing the moving parts in position upon the initiation of a resetting operation;

Fig. 4 is a side view, partially in cross section, of the resetting mechanism showing the moving parts in the "at rest" position at the completion of a resetting operation and with the pump motor turned off;

Fig. 5 is a cross-sectional view taken along the line 5—5 of Fig. 4;

Fig. 6 is a cross-sectional view taken along the line 6—6 of Fig. 4; and

Fig. 7 is a cross-sectional view taken along the line 7—7 of Fig. 4.

Referring to Fig. 1 of the drawings, there is shown diagrammatically a conventional gasoline dispensing apparatus. The apparatus is contained in an elongated upright housing **10** and the various portions of the apparatus are mounted on a frame **12**. As is usual in conventional gasoline dispensing apparatus, the apparatus includes a

prime mover which, as shown in the drawings, is an electric motor **14**. The electric motor **14** is connected to a pump **16** by means of a belt **18** extending around pulleys **20** and **22** secured to the shafts of the motor **14** and pump **16**, respectively.

The pump **16** has an inlet **24** which is adapted to be connected to a source (not shown) of gasoline or other liquid to be dispensed. The outlet **26** of the pump **16** is connected by a conduit **28** to a meter **30** which in turn has an outlet **32** which is adapted to be connected to the conventional flexible hose and nozzle (not shown) by which the gasoline or other liquid is dispensed. As will be apparent, when the motor **14** is energized, it drives the pump **16** which forces the liquid from the source of supply through the meter to the dispensing hose with the result that the meter output shaft **34** will be turned in proportion to the amount or quantity of the liquid dispensed.

The output shaft **34** of the meter **30** is connected to a speed change mechanism or variator **36** which may be of conventional construction and which in turn is connected to the counter or register mechanism **38**. The register or counting mechanism **38** is shown in more detail in Fig. 2 of the drawings and will be further described hereinafter.

The resetting mechanism of the present invention is referred to generally by the reference numeral **40**. The mechanism is adapted to be mounted on the frame **12**, for example, adjacent the register or counter **38** and the input shaft thereof includes a pulley **42** which may be connected by means of a belt **44** to a second pulley **46** on the shaft of the pump **16**. Of course, if desired, the resetting mechanism of the present invention could be driven directly from the pump motor **14**.

The pump motor **14** is provided with the usual switch **15** by means of which the motor can be turned off and on. The switch **15** is connected by a connecting rod **48** to a bell crank lever **50** which, for convenience, may be pivotally mounted on a stud **52** on the exterior of the speed change mechanism or variator **36**. The bell crank lever **50** is adapted to be moved by the operator to open and close the pump motor switch **15** as desired to commence or terminate a dispensing operation. For convenience, the bell crank lever **50** may be connected to the hose hook support (not shown) whereby the pump motor may be turned on as an incident to or dependent upon the removal of the hose nozzle from the support. One end of the bell crank lever **50** is connected by a connecting rod **54** to an arm **56** mounted on a shaft **58** of the resetting mechanism to be described more particularly hereinafter.

Referring more particularly to Figs. 3 through 7 of the drawings, which show the details of the construction of the resetting mechanism **40**, it will be seen that the mechanism **40** is contained in a generally rectangular housing **60**. The pulley **42** previously referred to as being rotated by the belt **44**, which in turn is driven by the pump **16** or pump motor **14**, has a hub **43** which is pinned to a shaft **62** which is rotatably mounted in bearings **64** contained in a journal **66** which is bolted to an aperture **68** in the side of the housing **60** by any suitable fastening means such as bolts **70**. Secured to the inner end of the shaft **62** interiorly of the housing **60** is a driving member **72** of a tooth clutch denoted generally by the reference numeral **74**. The movable driven member **76** of the tooth clutch **74** is rotatably and slidably mounted on a shaft **78** which is supported in alignment with the shaft **62** by being pinned to a boss **80** on the opposite face of the housing **60**.

The clutch driving member **72** is provided with a plurality of radially extending shoulders **73** which may be engaged by teeth **75** on the movable driven member **76**. Accordingly, when the movable member **76** is moved to

the left, as viewed in Fig. 4 of the drawings, the clutch will be engaged and when the movable member 76 is moved to the right, the clutch will be disengaged. In order to prevent any clicking or touching of the teeth 75 and shoulders 73 when the clutch is disengaged, which might occur due to endwise play in the shaft 62, the shaft 78 is provided with an axial bore 82 in which is disposed a plunger 84 urged outwardly by a compression spring 86. Since the outer end of the plunger 84 engages against the face of the driving member 72, it urges the shaft 62 to the left, as viewed in Fig. 4, thus effectively preventing the clutch member from engaging due to looseness or end play in the shaft 62.

The movable clutch member 76 is provided with an annular groove 77 and a pair of rearwardly extending projections 79. The tail-like projections 79 slidably extend into aligned slots or notches 88 formed in the hub 89 of a worm 90 which is freely rotatably mounted on the shaft 78. The lengths of the projections 79 and slots 88 are such that the movable member 76 of the clutch will be in driving engagement with the worm 90 regardless of its axial position, thus insuring that it will drive the worm 90 when moved to engaging position.

The means for engaging and disengaging the clutch 74 is a lever arm 92 having a central hub 94 which is rotatably mounted on a stud 96 extending between the end plates of the housing 60. Extending downwardly from the hub 94 on opposite sides of the movable clutch member 76 are a pair of arms 95 and 97. Mounted on the extremities of the arms 95 and 97 are rollers 98 which are rotatably mounted on studs 99 extending inwardly from the arms 95 and 97. The rollers 98 engage in the annular groove 77 in the movable clutch member 76 so that, when the lever arm 92 is pivoted in a clockwise direction, as viewed in Fig. 4 of the drawings, the clutch will be engaged and, conversely, when the lever arm 92 is pivoted in a counterclockwise direction, the clutch will be disengaged.

Cooperating with and in engagement with the worm 90 is a worm wheel 100 which is fixed to a transverse shaft 102 extending outwardly through the side plate of the housing 60. The worm wheel 100, of course, is adapted to be rotated by the worm 90 whenever the clutch 74 is engaged. The outer end of the shaft 102 which extends outwardly from the housing 60 is adapted to be connected to the resetting shaft of the computer or register. In the specific embodiment shown, the outer end of the shaft 102 has fixed thereto a crank 104 which is connected by a connecting rod 106 to a crank 108 connected to the reset shaft 110 of the register 38, whereby an oscillating movement is imparted to the reset shaft 110 upon each rotation of the shaft 102. If desired, however, a belt or chain drive could be substituted between the register and resetting mechanism in order to turn the resetting shaft 110 in a single continuous direction, which is necessary in some types of registers.

In the embodiment shown in the drawings, the mechanism is so arranged that when the clutch 74 is engaged, the worm wheel 100 will be turned one complete revolution and then the clutch 74 will be automatically disengaged. In order to control the clutch operating arm 92, there is provided a rotatable disc or plate 112 which is coaxially mounted in side-by-side relationship with the worm wheel 100 on the shaft 102 and this plate 112 carries adjacent its periphery a roller 114 which, when the plate 112 is rotated to the position shown in Fig. 4 of the drawings, will cam the clutch actuating arm 92 to the clutch disengaging position. The clutch actuating arm 92 is biased in a clutch engaging direction by means of a spring 116 fastened to the outer end of arm 92 and anchored at its other end on the housing 60. The function of the spring 116 is to cause the clutch 74 to become engaged whenever the roller 114 is moved from the camming position shown in Fig. 4 of the drawings.

The plate 112 is adapted to be driven by the worm wheel 100 through a lost motion connection consisting of a laterally projecting pin 118 on the plate 112 which extends into an elongated slot 120 in the adjacent outer surface of the worm wheel 100. The function of the lost motion on pin and slot connection just described is to permit the plate 112 to be rotatably advanced ahead of the worm wheel 100 so as to permit the lever arm 92 to move to clutch engaging position while at the same time insuring, after a brief time interval, that the plate 112 will be positively driven by the worm wheel 100 so that, at the completion of one turn of the worm wheel 100, the roller 114 carried by the plate 112 will cam the clutch operating arm 92 to clutch disengaging position, thus halting the operation of the mechanism.

For convenience of manufacture, there is fixed to the side of the worm wheel 100 intermediate the worm wheel 100 and the plate 112 a spacer plate 122 which has a notch 124 in its periphery which corresponds and registers with the slot 120 formed in the face of the worm wheel 100. What notch 124 does, in effect, is increase the depth of the slot 120 facilitating manufacture of the device and avoiding the necessity for close tolerances. The spacer plate 122 also has a peripheral notch 126 so that it will not interfere with the movements of the roller 114 previously referred to as being mounted on the plate 112. So far as the invention is concerned, the presence of the spacer plate 122 may be ignored.

In order to initiate the operation of the resetting mechanism, there is provided the transverse shaft 58 previously referred to as carrying the lever arm 56 which is connected by a connecting rod 54 to the bell crank 50. As a result, the shaft 58 is adapted to be rotated in a counterclockwise direction whenever the pump motor is turned on. Conversely, the shaft 58 must be rotated in a clockwise direction whenever the pump motor is turned off.

Within the casing 60 and in radial alignment with the disk 112 is a pivoted lever in the form of a plate 130 which is fixed to the shaft 58 referred to above. Carried by the plate 130 is a starting pawl 132 which is pivotally mounted on the plate at 134 and which is biased in a clockwise direction, as viewed in Fig. 4, by means of spring 136. The nose 138 of the pawl 132 is offset as shown so that it also lies in the plane of the plate 112. Adjacent the roller 114 is a notch 140 in the periphery of the plate 112 which will receive the nose of the pawl 132. The notch 140 is in pawl-receiving position when it is in the position shown in Fig. 4, i. e. with the roller 114 camming the clutch operating arm 92 to clutch disengaging position.

As a result of the arrangement described, when the shaft 58 and hence the plate 130 are rotated in a counterclockwise direction to the position shown in Fig. 3, the resulting travel of the pawl 132 on the plate 130 will rotatably advance the plate 112 so that the roller 114 will ride off the offset end of the clutch actuating arm 92 and permit the spring 116 to move the arm 92 to clutch engaging position. Since in the specific embodiment shown in the drawings, the aforesaid counterclockwise rotation of shaft 58 takes place simultaneously with the closing of the motor switch 15, the pulley 42, shaft 62, and clutch member 72 will immediately begin to rotate. Accordingly, the engagement of the clutch 74 will impart movement to the worm wheel 100. The worm wheel 100 will continue to rotate without driving the plate 112, (ignoring friction), until the trailing end of the slot 120 engages the pin 118 carried by the plate 112 whereupon the plate 112 is rotated in synchronism with the worm wheel 100 until the roller 114 makes a complete circuit and again engages against the edge of the clutch actuating arm 92, causing the clutch to become disengaged.

The worm 90 and worm wheel 100 provide a desirable speed ratio whereby the reset shaft of the register is turned at a desired rate of speed which preferably is sufficiently rapid so that resetting of the register will be accomplished during a brief time interval. A brief time interval in-

sures that the operator will not have an opportunity to dispense any gasoline before the register has been reset or at least will not be able to dispense an appreciable quantity. In any event, the operator would not be under any incentive to dispense before resetting is completed, since the quantity so dispensed would not be registered and thus would not be charged against the customer.

On the other hand, it would be a disadvantage to permit the operator to turn the pump motor on and off in such succession that the resetting mechanism would not have sufficient time to complete the resetting operation. To avoid this possibility, the plate **130** is so arranged that the edge **131** of the plate **130** will cooperate with the plate **112** to retain the plate **130** and hence shaft **58** in the rotated position shown in Fig. 3 of the drawings for a sufficient length of time to insure complete resetting. As will be noted, the plate **112** has a latching shoulder **113** extending approximately halfway around the plate **112** which will engage against the edge **131** during the first half turn of the plate **112** and thus latch the plate **130** in the "on" position and prevent the operator from turning the pump motor off. Thereafter, the pump motor may be turned off but the inertia of the pump motor is such that the apparatus will coact to completion of resetting before the movement thereof is entirely stopped.

As previously mentioned, the shaft **102** may be connected to the resetting shaft of the register in any desired manner. The mechanism is particularly suitable for registers of the type having a reset shaft which is oscillated in order to reset the register to zero. With such a register, it is an advantage that a connecting rod, such as the connecting rod **106**, may be employed in place of a belt or chain drive connection to the reset shaft.

A register **38** of the type having a reset shaft which is oscillated in order to reset the register to zero is illustrated generally in Fig. 2 of the drawings. Referring to Fig. 2 of the drawings, it will be seen that the register **38** includes a frame **140** on the opposite ends of which are mounted transverse number wheel supporting shafts **142** and **144**. Disposed on the shafts **142** and **144** in side-by-side relationship are the number wheels **146** for registering the quantity of liquid dispensed and the cost thereof. The means for driving the number wheels, for transferring the count from the number wheels of lower order to the number wheels of higher order, and for disconnecting the driving mechanism in order to permit resetting are omitted for the most part from the drawings and will not be described herein since the same forms no part of the present invention and an understanding of the same is not necessary in order to understand the present invention.

The register **38**, as illustrated in Fig. 2 of the drawings, is of the type employing a heart-shaped cam reset. For this purpose each of the number wheels is provided with a heart-shaped cam **148** fixed to the side of each wheel and by means of which the wheel may be returned to zero. Mounted on auxiliary transverse shafts **150** and **152** are cam actuating arms **154** referred to in the claims as "reset arms," the shafts **150** and **152** being referred to as "reset arm shafts." The operation of the cam actuating arms **154** is such that, when the shaft **150** is turned in a counterclockwise direction and the shaft **152** is turned in a clockwise direction, the free end of each cam actuating arm **154** will engage upon the periphery of its cooperating heart-shaped cam **148** and rotate the associated number wheels to zero.

As previously mentioned, the register **38** is adapted to be reset by oscillating the reset shaft **110**. For this purpose there is fixed to the reset shaft **110** a relatively long crank **108** which is connected by the connecting rod **106** to the crank **104** on the shaft **102** of the resetting mechanism **40**. As a result of this connection, when the drive shaft **102** of the resetting mechanism is rotated through one revolution, thus revolving the crank **104**, the crank **108** is first pulled down in a clockwise direction and is then returned in a reverse direction to original starting position.

As shown in dotted lines in Fig. 2 of the drawings, there is provided a driving gear **156** which is freely mounted on the reset shaft **110** but which is adapted to be driven when the reset shaft is turned by reason of a coil spring **158** which has one end thereof secured to the shaft and which has the other end in engagement with the gear **156**. The purpose of the drive between the shaft **110** and the gear **156** through spring **158** is to permit the shaft **110** to rotate independently of movement of the gear **156** in the event that turning movement of the gear **156** is prevented.

The gear **156** is in mesh with a gear segment **160** which is fixed to a transverse shaft **162**. Also fixed to the shaft **162** is a two-segment gear **164** having a portion **164***a* in mesh with a gear segment **166** fixed to the shaft **152** previously referred to. The remaining portion **164***b* of the two-segment gear **164** is in mesh with a two-segment gear **168** which in turn meshes with a gear segment **170** fixed to the transverse shaft **150**. The function of the gear train just described is to cause the shafts **150** and **152** to be rotated counterclockwise and clockwise, respectively, when the reset shaft **110** is rotated in a clockwise direction during the first half of a resetting operation. Conversely, when the reset shaft **110** is rotated in a reverse direction (counterclockwise) during the second half of the resetting operation, the shafts **150** and **152** will be rotated in a clockwise and counterclockwise direction, respectively. The spring drive **158** is sufficiently strong so that during a normal resetting operation the cam actuating arms **154** will be driven with sufficient force to reset the number wheels to zero. In the event resetting of one or more of the number wheels to zero is prevented by the circumstance that one or more of the heart-shaped cams is so disposed that the point thereof is engaged by the cooperating cam actuating arm **154**, movement of the gear train will be prevented but this will not prevent turning of the reset shaft **110** by reason of the resilient connection provided by the spring **158**, as previously described.

In the event that resetting of the register to zero is prevented for the reason given before, it is desirable that provision be made to automatically turn off the pump motor so that the operator will be required to again turn on the pump motor in order to carry out a dispensing operation which, as previously described, will also cause the resetting operation to be repeated. It has been found that the positioning of the heart-shaped cams which would prevent resetting is so critical that stoppage occurs only very rarely and that any slight amount of vibration such as a repetition of the resetting operation will invariably be sufficient to jar the mechanism from obstructing position, thus permitting resetting to go to completion during the subsequent resetting operation.

To provide the desired automatic turn-off of the pump motor in the rare event that complete resetting is prevented on the first attempt, there is included in the mechanism, in accordance with the invention, a projecting arm **172** secured to the hub of the crank **108**. Also there is provided a crank **174** having a hub **175** freely mounted on the outer end of shaft **150** and provided with an outwardly projecting arm **176**. The projecting arms **172** and **176** are in the same plane and of such length that the arm **176** will interfere with the travel of the arm **172** when the arm **176** is in the position shown in Figs. 1 and 2 of the drawings. As best shown in Fig. 2A of the drawings, the projecting arm **176** is normally held in the obstructing position referred to by a coil spring **178** which is disposed on the hub **180** of the gear segment **170** with the ends of the spring **178** extending on opposite sides of pins **182** and **184** on the segment **170** and arm **176**, respectively. During a normal resetting operation in which resetting goes to com-

pletion the gear segment 170 will be rotated in a counterclockwise direction and, by reason of the connection with crank 174 and projecting arm 176 through spring 178, will also pivot the latter to non-obstructing position. In the event that resetting cannot go to completion, the rotation of gear segment 170 will not be sufficient to pivot the arm 176 to non-obstructing position. In that event the projecting arm 172 on the reset crank 168 will wipe past the projecting arm 176 to the position shown in dotted lines in Fig. 1 of the drawings, this being permitted by the resilient mounting of arm 176 by spring 178. Then, on the return movement of crank 168 to complete the operation, arm 172 again wipes past arm 176, this time pivoting arm 176 in a clockwise direction.

The outer end of the crank 174 is provided with a stud 186 having a transverse bore 187 which slidably receives one end of a connecting rod 188. Connecting rod 188 is connected at its other end to the crank 56 which, in turn, is connected to the motor switch through connecting rods 54 and 48 and bell crank 50. The upper end of the connecting rod 188 adjacent to where it extends through the stud 186 is provided with a pair of adjustable stopnuts 190. As a result, the crank 174 can be freely turned in a counterclockwise direction (such as during a normal resetting operation) without any effect upon the connecting rod 188. However, if the crank 174 is rotated in a clockwise direction, which will occur upon the return of the reset crank 168 to original position if there is a stoppage in the resetting operation as previously described, the stud 186 will engage against the stopnuts 190, thus tensioning the connecting rod 188 and turning off the pump motor switch 15. The operator is thus compelled to again turn on the pump motor switch in order to carry out the dispensing operation which automatically repeats the resetting operation. The repeated resetting operation invariably will go to completion and then dispensing can be carried out in the usual manner.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. In a liquid dispensing apparatus including a pump motor and a register having a reset shaft, a mechanism for connection between the reset shaft and pump motor to cause the register to be reset when operation of the pump motor is initiated comprising a clutch having a driving member connected to the pump motor, a disengageable clutch driven member, means for disengaging the clutch driven member including a cam, means connecting the clutch driven member and the register reset shaft including means for driving the cam, and means for advancing the cam independently of the last-named means when the pump motor is turned on.

2. In a liquid dispensing apparatus including a pump motor and a register having a reset shaft, means for actuating the register reset shaft when the motor is turned on comprising a rotatable member, means for driving the rotatable member by the pump motor including a disengageable clutch, means including a rotatable cam for disengaging the clutch at one rotated position of the cam, a lost motion connection between the cam and the rotatable member, and means for advancing the cam when the pump motor is turned on.

3. In a liquid dispensing apparatus including a pump motor and a register having a reset shaft, a reset mechanism comprising a worm and worm wheel, means connecting the worm to the pump motor including a disengageable clutch, an actuating arm for the clutch, a cam mounted coaxially with the worm wheel for engaging the arm at one rotated position of the cam, a lost motion connection between the cam and worm wheel, and means for advancing the cam to permit the clutch to engage when the pump motor is turned on.

4. In a liquid dispensing apparatus including a pump motor and a register having a reset shaft, a reset mechanism for actuating the register shaft by the pump motor comprising a rotatable member connected to the reset shaft, means for driving the rotatable member by the pump motor including a disengageable clutch, means including a rotatable cam for disengaging the clutch at one rotated position of the cam, a lost motion connection between the cam and the rotatable member, and a manually movable member for engaging the cam to advance the cam to initiate a resetting operation.

5. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on comprising a rotatable member connected to the reset shaft, means for driving the rotatable member by the pump motor including a disengageable clutch, means including a rotatable cam for disengaging the clutch at one rotated position of the cam, a lost motion connection between the cam and the rotatable member, and a movable member connected to the motor switch for advancing the cam when the pump motor is turned on.

6. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on comprising a rotatable member connected to the reset shaft, means for driving the rotatable member by the pump motor including a disengageable clutch, means including a rotatable cam for disengaging the clutch at one rotated position of the cam, a lost motion connection between the cam and the rotatable member, a pivoted lever connected to the pump motor switch, and a pawl on the lever for advancing the cam when the pump motor is turned on.

7. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on comprising a rotatable member connected to the reset shaft, a driving connection between the pump motor and the rotatable member including a disengageable clutch, a lever arm for disengaging the clutch, a cam mounted on the rotatable member for limited relative movement therebetween engageable with the lever arm at one rotated position of the cam to move the lever arm to clutch disengaging position, and a movable member connected to the motor switch for advancing the cam from said one rotated position when the pump motor is turned on.

8. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism comprising a worm and worm wheel, a driving connection between the pump motor and the worm including a disengageable clutch, a lever arm for disengaging the clutch, a cam mounted coaxially with the worm wheel for moving the lever arm to clutch disengaging position at one rotated position of the cam, a pin and slot driving connection between the worm wheel and cam permitting advancement of the cam relative to the worm wheel, a pawl for advancing the cam, and manually operable means for actuating the pawl connected to the motor switch.

9. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a

reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on including a rotatable plate member having a latching shoulder thereon, and a pivoted lever mounted for pivoting movement through the orbit of movement of the latching shoulder, said pivoted lever being connected to the pump motor switch.

10. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on comprising a rotatable member connected to the reset shaft, a driving connection between the pump motor and the rotatable member including a clutch, a disc connected to the rotatable member for rotation therewith and having means thereon for disengaging the clutch at the completion of reset, said disc having a radially extending protuberance extending partially about the periphery thereof, and means connected to the pump motor switch for engaging the clutch when the pump motor is turned on including a pivoted lever mounted for pivoting movement through the orbit of movement of said protuberance.

11. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on comprising a rotatable member connected to the reset shaft, a driving connection between the pump motor and the rotatable member including a disengageable clutch, means including a rotatable cam for disengaging the clutch at one rotated position of the cam, a lost motion, connection between the cam and the rotatable member, a manually movable member connected to the pump motor switch for advancing the cam when the pump motor is turned on, and means for preventing reverse movement of the manually movable member to open switch position during predetermined movement of the rotatable member.

12. In a liquid dispensing apparatus including a pump motor, a pump motor switch, and a register having a reset shaft, a reset mechanism for actuating the register reset shaft when the pump motor is turned on comprising a rotatable member connected to the reset shaft, a driving connection between the pump motor and the rotatable member including a disengageable clutch, means including a rotatable cam on the rotatable member for disengaging the clutch at one rotated position of the cam, a lost motion connection between the cam and the rotatable member, a pivotal lever connected to the pump motor switch for advancing the cam when the pump is turned on, and means on the cam for preventing reverse movement of the lever to open the pump motor switch during predetermined movement of the cam.

13. In a liquid dispensing apparatus including a pump motor, and a register of the heart-shaped cam type having a reciprocal reset shaft, a reset mechanism driven by the pump motor for reciprocating the register reset shaft, means for initiating the operation of the reset mechanism when the pump motor is turned on, and means for turning off the pump motor when reciprocation of the reset shaft does not reset the register to zero.

14. In a liquid dispensing apparatus including a pump motor, and a register of the heart-shaped cam type having a reciprocal reset shaft and a reset arm shaft, the combination comprising a reset mechanism driven by the pump motor for reciprocating the register reset shaft, means for initiating the operation of the reset mechanism when the pump motor is turned on, and means responsive to movement of the reset arm shaft for turning off the pump motor if the register is not reset to zero.

15. In a liquid dispensing apparatus including a pump motor and a pump motor switch, a register of the heart-shaped cam type having a reciprocal reset shaft, a reset arm shaft and a resilient driving connection therebetween, a reset mechanism driven by the pump motor for reciprocating the register reset shaft, means connected to the pump motor switch for initiating operation of the reset mechanism when the pump motor is turned on, and means connected to the pump motor switch and operated by relative movement of the reset shaft and reset arm shaft for de-energizing the motor when movement of the reset arm shaft is insufficient to reset the register to zero.

16. In a liquid dispensing apparatus including a pump motor and a pump motor switch, a register of the heart-shaped cam type having a reciprocal reset shaft, a reset arm shaft and a resilient driving connection therebetween, a reset mechanism driven by the pump motor for reciprocating the register reset shaft, means connected to the pump motor switch for initiating operation of the reset mechanism when the pump motor is turned on, a first lateral extension resiliently mounted on the reset arm shaft connected to the pump motor switch, and a lateral extension on the reset shaft for actuating the first lateral extension and thus the pump motor switch when movement of the reset arm shaft is insufficient to reset the register to zero.

17. In a liquid dispensing apparatus including a pump motor and a pump motor switch, a register of the heart-shaped cam type having a reciprocal reset shaft, a reset arm shaft and a resilient driving connection therebetween, a rotatable member connected to the reset shaft to reciprocate the same during one rotation of the rotatable member, a driving connection between the pump motor and the rotatable member including a disengageable clutch, means including a rotatable cam on the rotatable member for disengaging the clutch at one rotated position of the cam, a lost motion connection between the cam and the rotatable member, means connected to the pump motor switch for advancing the cam when the pump motor is turned on, a first arm resiliently mounted on the reset arm shaft of the register and connected to the pump motor switch, and an arm fixed to the reset shaft of the register for engaging the first arm to actuate the pump motor switch, said first arm being moved to non-engaging position when the register is reset to zero.

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