April 11, 1967 I. A. JOHNSON 3,313,453

METERING AND RECORDING INTERLOCK UNIT

Filed Oct. 27, 1964 4 Sheets-Sheet 1

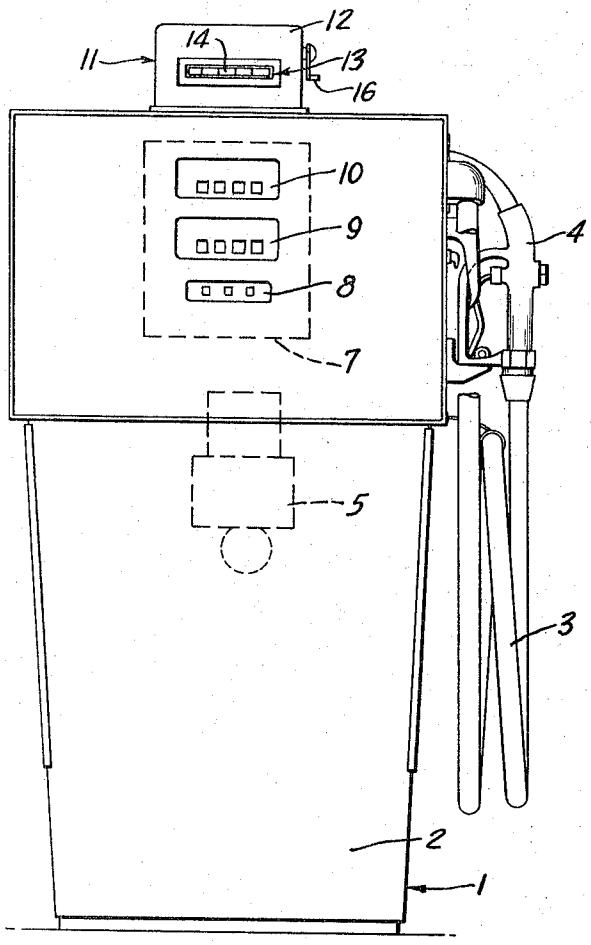



Fig. 1.

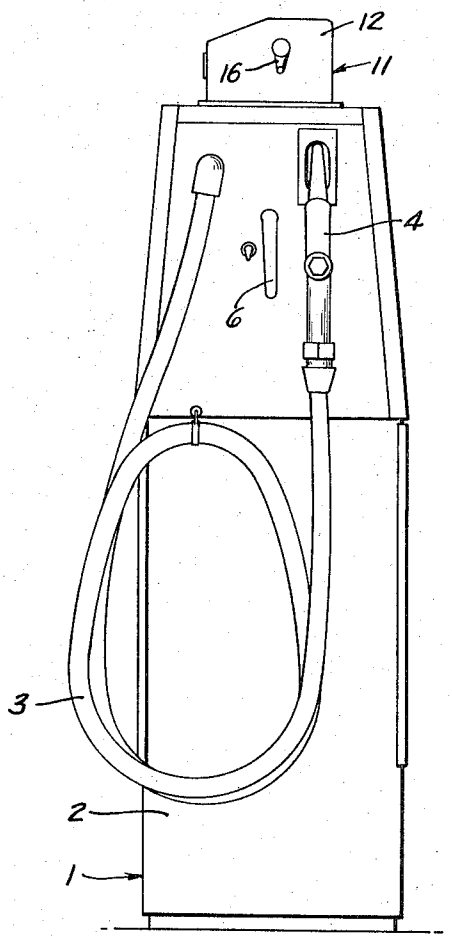



Fig. 2.

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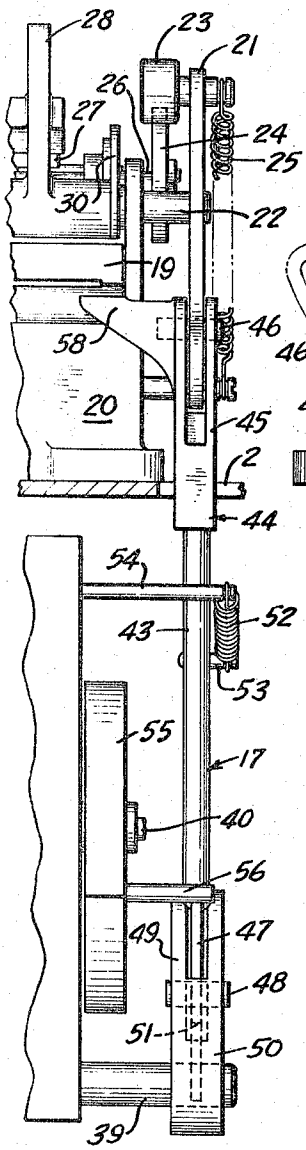



Fig. 4.

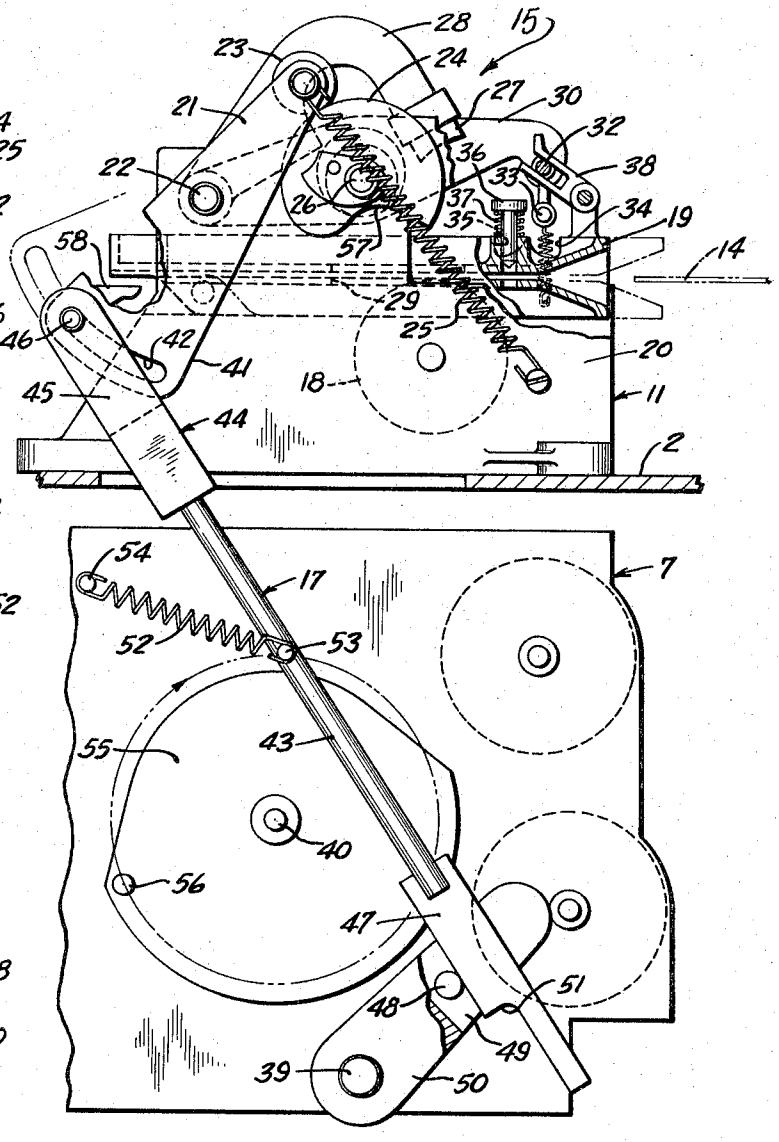



Fig. 3.

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METERING AND RECORDING INTERLOCK UNIT

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Fig. 6.

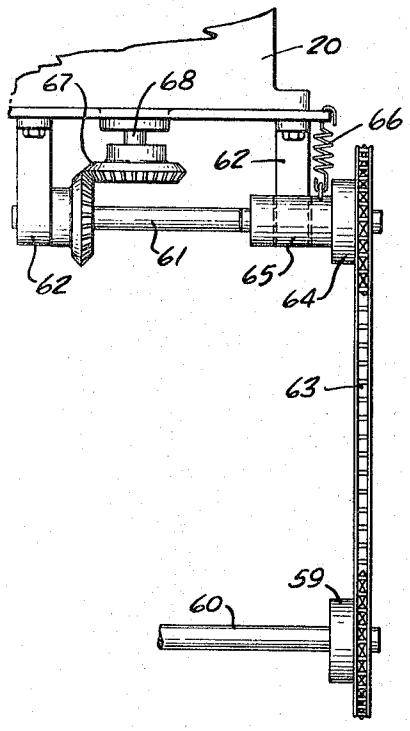
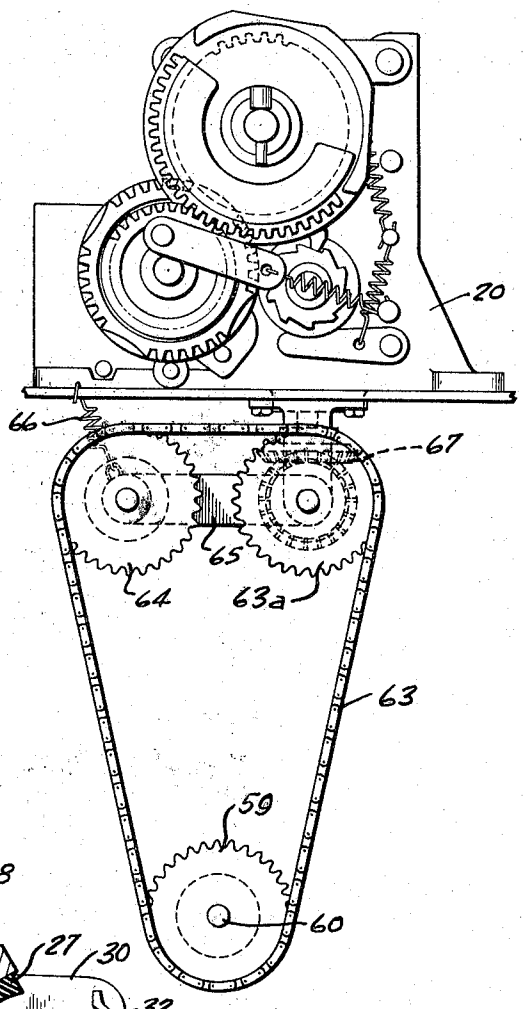



Fig. 7.



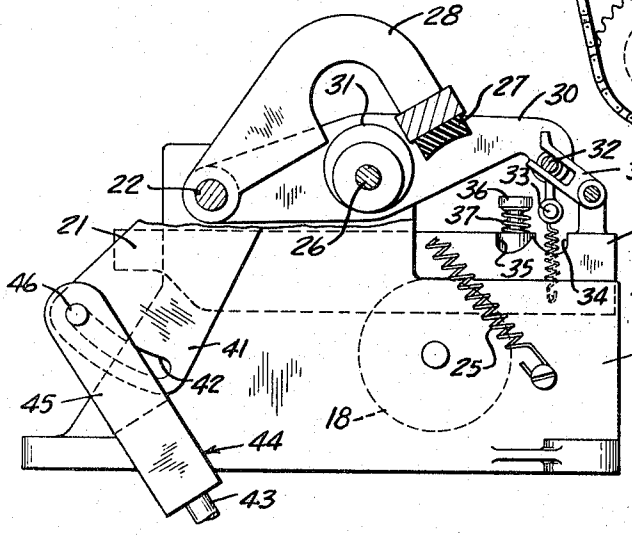




Fig. 5.

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METERING AND RECORDING INTERLOCK UNIT

Filed Oct. 27, 1964 4 Sheets-Sheet 4

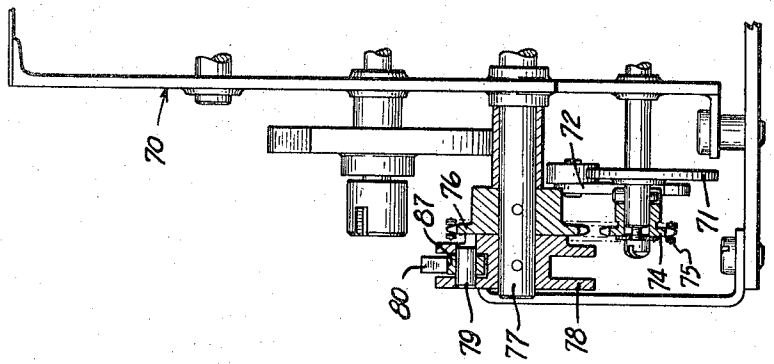



Fig. 9.

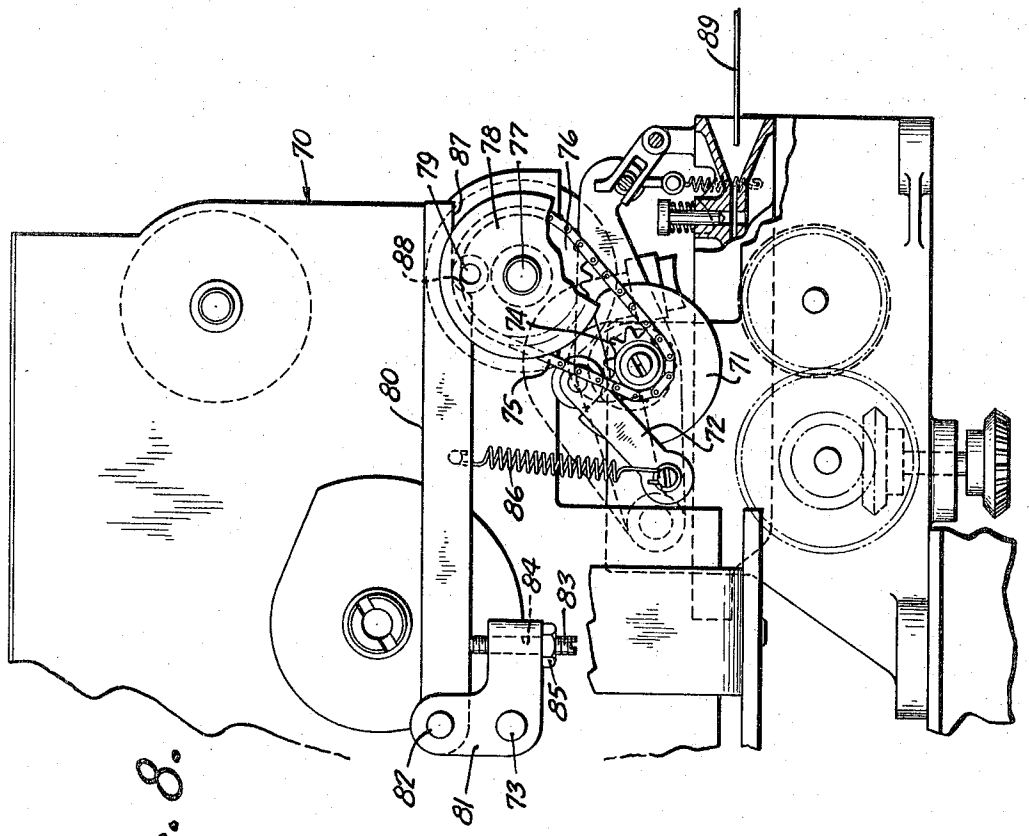



Fig. 8.

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United States Patent Office 3,313,453
Patented Apr. 11, 1967



3,313,453

# METERING AND RECORDING INTERLOCK UNIT

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Filed Oct. 27, 1964, Ser. No. 406,776
15 Claims. (Cl. 222—30)

This invention relates to a metering and recording interlock unit and particularly to an interlock for simultaneously metering and recording the dispensing of gasoline or the like through a conventional gasoline dispensing unit while providing an individual permanent record of each transaction.

The present invention is particularly applicable to retail gasoline dispensing systems for trucks and similar vehicles where the truck drivers require a printed receipt of the gasoline purchased. In order to provide an automatic printed receipt, it is desirable to provide a printer mechanism interconnected to the computer mechanism of the gasoline dispensing unit with the printer automatically driven in accordance with the computer mechanism of the gasoline dispensing unit. Although combined meter register and ticket printers are available, they are specially constructed devices having separate operating and resetting mechanisms. Such devices have been generally applied in bulk metering systems and have not been particularly adapted to the conventional gasoline dispensing units or the like.

The present invention is particularly directed to an improved system for combining a printer mechanism with a conventional gasoline dispensing unit or the like and is particularly directed to a resetting and interlocking mechanism whereby a printer or similar duplicator and a computer are interconnected to be reset through a single actuating element or lever which preferably resets both devices to zero. The dispensing unit is further of the type which includes a control responsive to zero positioning to condition the unit for dispensing of gasoline. The present invention thus provides for simultaneous operation of the two devices and particularly prevents resetting of the computer without actuation of the printer which would permit accidental or fraudulent printing of excess gallonage.

In a preferred construction, the present invention provides a printer interconnected to the computer mechanism in a manner preventing access under normal conditions to a coupling mechanism interconnecting the printer to the computer mechanism. In operation, the printer mechanism is provided with a rotating or revolving reset and printing mechanism with the printing of each cycle requiring one complete revolution of the cycle or resetting member. During the initial cycle, the printer is reset to zero and a card or the like is impressed with the initial zero reading. During the terminal portion of the resetting cycle of the printer, the computer is reset to zero. Gasoline dispensing computers and the like include interlocking mechanism which prevents dispensing of gasoline until they have been reset to zero. Consequently, with the described sequence, both the printer and the computer must be reset to zero in order to dispense gasoline. The second cycle or revolution of the printer mechanism is operable only to effect a printing of the gasoline dispensed on the ticket. That is, the interlocking coupling mechanism is such that neither the printer or the computer mechanism are reset during this cycle. Therefore, a subsequent delivery requires resetting of both the printer and the computer in the above manner.

Generally, the preferred construction of the present invention provides an interlocking coupling mechanism interconnecting the printer or duplicator with the computer mechanism to an input member. This coupling includes



a lost motion mechanism which permits resetting of the printer prior to the resetting of the computer and further permits the final actuation of the printer to effect a printing operation without resetting of the computer mechanism. The lost motion device thus provides a very simple mechanical system to provide the necessary timed movement and interaction of the resetting mechanism through a single reset lever.

In one aspect of the present invention, a conventional duplicator employing a cammed reset mechanism is interconnected through the computer. An interlocking lever is positioned by the cam and an operating rod is interconnected to the interlock lever through a lost motion connection, such as a pin and slot connection. The operating rod carries a notched follower mechanism which is adapted to engage a reset lever on the computer reset shaft. A resilient means constantly urges the operating rod upwardly to the one end of the lost motion connection with the follower in engagement with the computer reset lever. During initial cam movement, the interlock lever pivots upwardly with the rod moving with it until the notch is aligned with the reset lever and drops into operative coupling therewith. When the interlock lever moves through the depressed portion of the cam, the rod is thus reciprocated with respect to the computer lever to engage the notch and then moves the lever downwardly to disengage the notch thereby effecting a resetting actuation of the reset lever. Resetting of the computer drives a resetting mechanism which includes a release pin moved into engagement with the operating rod and forcing it into spaced relation to the reset lever to prevent subsequent actuation of the reset lever and establish a lost motion movement of the rod with respect to the lever as follows. A stop mechanism is further interconnected with the printer or other mechanism actuated by the cam. It begins in an initial locking position and particularly in a path of movement of a portion of the operating rod. The initial movement of the cam mechanism is effective to move this interlocking member from the path of the operating rod to permit the above described resetting movement. However, during the second cycle of the cam, the member is returned to its locking position and thereby prevents movement of the rod. As a result, the printer mechanism or duplicating mechanism can be actuated through its two cycles with the first cycle effecting a resetting of the printer and the computer and the second cycle merely effecting a printing operation without resetting of the computer.

In another aspect of the present invention, a multiple leg reset lever is secured to the computer reset shaft with an operating rod or arm secured to one of the legs of the lever. The operating arm extends over another arm which carries a stop member to properly position the operating arm with respect to a duplicator driven pin. The pin is preferably carried by a hub member or a rotating member which is driven at one-half the speed of the computer or duplicating operating shaft. The hub member carries a pin which will move into camming engagement with a cam surface on the end of the arm. During this initial movement, the duplicating mechanism will be actuated to reset to zero and effect a locking of the printing card into position for example. During the terminal portion of the first revolution, the pin will move into operating engagement with the arm and cause it to move rectilinearly and angularly to pivot the computer reset shaft. Gasoline or the like can then be dispensed. During the final resetting or printing revolution of the duplicating of the reset lever, the operating pin moves through 180° to the initial starting position. This allows the duplicating mechanism to effect a recording of the final dispensing without resetting of the computer section of the gasoline dispensing unit.

The present invention thus provides a relatively inexpensive and simple interlock mechanism which will reliably permit actuation of a single member to provide sequential resetting of the duplicating mechanism and the computing mechanism during a first cycle of the single member and printing without resetting during a second cycle of this same member. The advantages and features of the invention as set forth above as well as others are clearly illustrated in the embodiments of the invention described hereinafter in connection with the drawings.

The present invention is particularly adapted to be employed with printing mechanisms of a well-known construction having a cam mechanism connected to the input duplicating or operating shaft for operating a printing mechanism with respect to a conventional card or the like. The initial movement of the printer arm locks the card in place and then resets the printing mechanism to zero and effects a printing of the zero reading on the card. The second cycle or revolution of this same member effects a printing of the movement of the mechanism onto the card and then releases the card for withdrawal from the mechanism.

This system provides a very rugged and reliable mechanism coupling which can be provided for interconnecting known printing devices to the computers of presently existing gasoline dispensers. Such a connection is a practical necessity in view of the existence and wide distribution of gasoline dispensers.

The drawings furnished herewith illustrate preferred constructions of the present invention clearly illustrating the above features and advantages as well as others which will be readily understood from the following description.

In the drawings:

FIG. 1 is a front elevational view of a conventional dispensing pump having a printer mechanism secured to the top thereof;

FIG. 2 is a side elevational view of the top portion of the dispensing pump shown in FIG. 1;

FIG. 3 is an enlarged side elevational view showing the printing mechanism and the computer mechanism interconnected by a coupling mechanism constructed in accordance with the present invention;

FIG. 4 is a front fragmentary elevational view of a portion of FIG. 3 again showing the coupling mechanism of the invention shown in FIG. 3;

FIG. 5 is a partial vertical section illustrating the cammed mounting of an actuating arm in the printing mechanism;

FIG. 6 is an elevational view of a quantity drive of the print mechanism from the computer of the dispensing pump;

FIG. 7 is a side elevational view of FIG. 6;

FIG. 8 is a side elevational view generally similar to FIG. 3 and showing an alternative construction of the embodiment of the invention; and

FIG. 9 is a fragmentary front elevational view showing the structure of FIG. 8.

Referring to the drawings and particularly to FIGS. 1 and 2, a conventional gasoline dispensing pump **1** is illustrated with the usual outer decorative housing **2**. A dispensing hose **3** is interconnected to the pumping mechanism within the housing **2** and terminates in a dispensing nozzle **4** mounted to the side of the pump **1**. The hose **3** is connected to withdraw gasoline from a storage tank, not shown, through a pumping mechanism shown diagrammatically in dotted outline within the housing as at **5**. An on-off control handle **6** is shown for turning the pump mechanism on and off in any well-known manner. The pump **1** includes a computer unit **7** within the upper portion of the housing **2** providing a visual cost per gallon display **8**, a gallonage dispense display **9** and an individual dispensing cost display **10**. In accordance with the illustrated embodiment of the present invention, a ticket printer unit **11** is mounted to the top of the dispenser housing **2** within an outer housing **12** sealed to the top of the pump housing **2**. A ticket opening or slot **13** is provided in the front of the printer unit **11** for accommodating a ticket or card **14** on which the amount of gasoline sold is to be printed for an individual sale. The printing mechanism **15** which is shown diagrammatically in FIGS. 3 and 4 is coupled to and actuated by a reset and printing crank **16** rotatably mounted to the one side of the housing **12**. The crank **16** constitutes a single or common member connected, as hereinafter described, to actuate a coupling for operating the computer unit **7** and the printer **11**.



The illustrated computer unit **7** and printer **11** may be of any known or suitable construction. Those illustrated herein are well known, commercially available devices and no further description thereof is given other than to clearly describe the operation and functioning of the present invention.

Referring particularly to FIGS. 3 and 4, an interlock coupling unit or mechanism **17** constructed in accordance with the present invention interconnects the computer unit **7** and the duplicating and printing unit **11** to provide the operation generally summarized as follows. The pump mechanism **5** is controlled by the on-off control lever **6** mounted to the one side of the pump housing **2**. However, the computer unit **7** includes an interlock switch mechanism, not shown, requiring that computer unit **7** be reset to zero before the movement of the lever **6** will complete the circuit to the pump mechanism **5**. In accordance with the present invention, the computer unit **7** is reset through the coupling mechanism **17** by rotating of the printer unit crank **16** which must be rotated through one complete revolution from the initial position during which the printing unit is reset and impresses the zero reading on the ticket or card **14**. During the terminal portion of the movement of the crank **16**, the computer **7** is reset to zero thereby permitting energization and operation of the pump mechanism **5**. As a result of the above sequence, the printing unit **11** and the computer unit **7** both must be reset to zero before a separate dispensing can be established. As a result, the operator cannot possibly allow a previous reading established in the system to remain therein for final recording. After a sale, the crank **16** is moved through a second complete revolution during which time it merely prints the previous dispensed volume or amount on the ticket or card **14** without resetting of the computer unit **7** or the printer unit **11**.

Referring particularly to FIGS. 3 and 4, the coupling **17** and a simplified illustration end view of the printing unit **11** and computer unit **7** are shown and described in sufficient detail to clearly explain the present invention.

The duplicating and printing unit **11** is of a well known construction having a plurality of number wheels **18** which may be coupled to the quantity drive shaft of the computer **7** in any suitable manner. A particularly satisfactory drive connection is shown in FIGS. 6 and 7 and described hereinafter. A tray **19** is slidably disposed within a printing frame structure **20**, immediately above the printing wheels **18** and includes a central front opening aligned with the slot **13** to receive the card **14**. A printing lever **21** is secured to a shaft **22** which is pivotally mounted in the inner end of frame **20**. Lever **21** is secured to the one side of the frame **20** and a guide or follower roller **23** is secured to the upper end thereof. The follower roller **23** is urged into positioning engagement with the periphery of a cam **24** by a suitable coil spring **25** which has one end secured to the lever **21** and the opposite end secured to frame **20** by a pin or the like.

A cam and reset operating shaft **26** is rotatably journaled immediately above the tray **19** within the frame structure **20**. The end of the cam shaft **26**, opposite from cam **24**, projects outwardly of the printer housing **12** with the crank **16** secured thereto. A suitable printing wheel reset mechanism, not shown, couples the shaft **26** to wheels **18** and preferably includes a gear train to reset the wheels upon selected rotation of crank **16**; for

example, as more fully shown and described in U.S. Patent 2,721,703. Rotation of the crank 16 also rotates the cam 24 with the printing lever 21 and attached shaft 22 oscillating through a selected angle for each revolution of crank 16. A printing platen 27 is carried at the outer end of a pair of arms 28 which are secured to the shaft 22 and pivot therewith such that the rotation of cam 24 permits the spring 25 to rapidly pivot the shaft 22 and the attached arm and moves the printing platen 27 downwardly through an opening 29 in tray 19 and forces card 14 into engagement with wheel 18 to provide an impression of the printing wheels on the card 14. A pair of tray shift arms 30 are pivotally secured at one end to the shaft 22 and each is interconnected through an eccentric cam 31 to the shaft 26, as shown in FIG. 5. The cam 31 is carried by and rotates with the cam shaft 26 to pivot the arms 30 in timed relation to the reset of wheels 18. A tray actuating shaft or arm 32 is pivotally secured to the ends of arms 30 and with spring loaded actuating members 33 projecting downwardly in alignment with operating recesses having a central deflection point in the top of tray 19 defining forward and rearward actuating shoulders 34 and 35. The initial rotation of the crank 16, shaft 26 and cam 31 pivots arms 30 to drop members 33 into the recesses forwardly of the deflection point and therefore into engagement with forward shoulders 34. This moves tray 19 outwardly to a printing position where it is held until a second rotation of crank 16 returns the tray to the retracted position. During the second cycle, the deflection point is located forwardly of the members 33 such that members move rearwardly into engagement with shoulders 35 and return the tray 19 to the starting position.

A locking pin 36 is slidably disposed within a vertical opening in the forward portion of the tray 19 with a spring 37 urging the pin upwardly out of the path of card 14. A U-shaped crank 38 is pivotally mounted on tray 19 and mates with the shaft arm 32. The movement of the arm 32 pivots the crank 38 and depresses the locking pin 36 into locking engagement with the card 14. The second revolution of the crank 16 lifts the locking pin 36 to release the card 14.

The above description of the printing unit is given in such detail as considered necessary to clearly explain the present invention and particularly the sequential operation of the unit 11 and the computer unit 7 as transmitted by the coupling mechanism 17. The computer unit 7 may be of any suitable or known construction having a reset shaft 39 mounted for oscillating movement and coupled to reset the counter wheels of the computer mechanism and forming a part of the gallonage display 9 and the cost display 10 upon an oscillatory motion imparted to the reset shaft. For example, United States Patents 2,836,363 and 2,869,791 disclose computer reset mechanisms having reset shafts which function as noted above. The computer unit 7 also includes an operating shaft 40 rotated through one revolution during the resetting of the computer unit 7.

The coupling 17 which generally forms the subject matter of the present invention includes a printing arm extension 41 which is integrally formed with the lower end of printing lever 21. The extension 41 includes an arcuate slot 42 generally having a center corresponding with the pivot shaft 22. A rod or connecting link 43 is secured at one end to the extension 41 by an adjustable coupling 44 which is threaded or otherwise secured to the end of the rod. Generally, the illustrated coupling 44 includes a bifurcated end 45 extending on opposite sides of the extension 41 with a pin 46 passing through the end 45 and the slot 42.

The illustrated slot and pin connection produces a lost motion connection, as hereinafter described, and any other suitable similar coupling can be employed.

An actuator 47 is threaded or otherwise secured to the opposite or lower end of the link 43 and is slidably supported on a pin 48 which is secured within the bifurcated end 49 of a reset lever 50. The actuator includes a notch 51 on its underside for selective engagement with pin 48. The lever 50 is secured to the computer reset shaft 39 such that pivotal movement of the reset lever 50 operates to reset the computer unit 7. A coil spring 52 is secured at one end to a pin 53 on the link 43 and at the opposite end to a fixed pin 54 secured to the wall of computer unit 7 above the level of pin 53. The spring 52 continuously urges the link 43 upwardly and to the left, as viewed in FIG. 3. As a result, the pin 46 at the upper end of the link 43 is urged into engagement with the uppermost end of the arcuate slot 42 and the actuator 47 is resiliently held in engagement with the reset lever pin 48. The link 43 extends across a shift cam 55 which is keyed or otherwise secured to the operating shaft 40 of the computer unit 7 and rotates therewith during a resetting motion of shaft 39. A pin 56 is secured to the outer peripheral portion of the cam 55 and rotates therewith during resetting of the indicating wheels of the computer unit 7. In the initial starting position, the pin 56 is spaced substantially 180 degrees from the position of the link 43. During the resetting motion, the pin 56 rotates into engagement with the link 43 and pivots the link about the pin 46 to positively release the actuator 47 from the reset lever pin 48 and reset the apparatus for the final print out cycle. The operation of the invention illustrated in FIGS. 1–5 is described as follows with particular reference to FIGS. 3–5.

Prior to actuation of the crank 16 to reset the computer unit 7, a ticket 14 is inserted into the meter duplicator and printing unit 11. The operating crank 16 is first rotated in a counterclockwise direction to release the mechanism and then in a clockwise direction through one complete revolution, as more fully described in the previously referred to U.S. patent. This rotates the cam 24 through one complete counterclockwise revolution as viewed in FIG. 3. During an initial rotation of the cam 24, lever 21 remains stationary as the cam has a constant radius. During this portion, the tray 19 moves forwardly, to the right as shown in FIGS. 3 and 5, as a result of the pivoting of arms 30 and movement of members 33 into engagement with tray shoulders 34. After moving of tray 19 to the right, the locking pin 36 is forced downwardly through the ticket or card 14 and locks it within the tray. The start of a cam recess 57 in the cam 24 is aligned with the follower 23 of lever 21 such that with the continued rotation of cam 24, the follower 23 and lever 21 pivot in a clockwise direction into the recess 57. Rotation of shaft 22 results in downward movement of the printing platen 27 with a resulting printing of the initial quantity, usually zero, upon the ticket card 14. Simultaneously the lever extension 41 pivots in a clock-wise direction and positions or moves the arcuate slot 42 in the extension upwardly to the dotted line position. The force of the spring 52 moves the link 43 upwardly with pin 46 engaging the end of the slot 42. The longitudinal movement of the link 43 aligns the relief or notch 51 in the actuator 47 with the reset lever pin 48. During the final movement of the reset crank 16 of the printing unit 11, the follower 23 moves out of the recess 57 and back onto the more remote perpherial edge of the cam 24. As a result, the lever 21 pivots in a counterclockwise direction to the full line position shown in FIG. 3. The slot 42 returns to the original position and forces the pin 46 and attached link 43 downwardly. As the reset lever pin 48 is engaged with the notch 51 of actuator 47, the reset lever 50 is pivoted downwardly to reset the computer 7 to zero. As the computer 7 is reset to zero, the operating shaft 40 rotates moving the attached cam 55 and the pin 56 in a clockwise direction, as viewed in FIG. 3. The pin 56 engages and carries the link 43 upwardly about pin 46 against the force of the spring 52 whereby the actuator 47 disengages the reset lever pin 48. As a result, the reset lever 50 returns to the normal standby position.

The coupling mechanism **17** is therefore again in the full line position except that the tray **19** has moved outwardly to the dotted line position and the locking pin **36** has pierced the card **14** to lock it within the tray. The reset has then been completed and an initial quantity printed on the card **14**. The dispensing pump **1** may then be turned on to dispense fuel in a conventional manner with the conventional interlock preventing operation of the dispenser prior to the above resetting movement.

After the desired amount of fuel has been dispensed, the printing unit crank **16** is again revolved through a complete revolution. However, during the second cycle, the sequence is as follows. The initial rotation of shaft **26** rotates the eccentric cam **31** to retract the arms **30** to return tray **19** to the initial full line position, prints the final quantity on the card **14** and then releases the pin **36** such that the ticket can be removed. Although the printing arm again goes through the same motion previously described, the resetting of the computer is prevented as follows.

A flange **58** is integrally secured to and forms a part of the coupling **44** of link **43**. Flange **58** is located directly beneath the normal position of the trailing or innermost end of the tray **19**. During the first cycle or revolution of the cam **26**, the tray **19** is moved outwardly and the link **43** is free to move upwardly. However, during the second revolution with the tray **19** returned to its normal standby position, the inner end of the tray **19** is disposed within the normal upward path of the flange. Consequently, the tray acts as a stop member holding the link **43** in the normal position when the arm **21** pivots to dispose the arcuate slot **42** in the raised position. As a result, the notch **51** of the actuator **47** on the lower end of the line **43** is prevented from engaging pin **48** and effecting resetting of the computer unit **7**.

If for any reason, the computer elements and particularly the display elements are not in proper relationship for resetting, the interlock pin **56** will be at the upper raised point and hold the link **43** with the actuator **47** in spaced relation to the reset lever pin **48**.

As previously noted, the computer unit **7** and duplicator or printing unit **11** are simultaneously driven in any suitable manner. A particularly satisfactory and novel method is shown in FIGS. 6 and 7.

A drive sprocket **59** is fixed to the quantity drive shaft **60** which is driven by the meter of the dispensing pump **1**. An intermediate shaft **61** is rotatably mounted within the pump **1** immediately beneath the printing unit **11** by suitable pillow blocks **62** and is coupled to the sprocket **59** by a chain **63**, as follows. A driven sprocket **63***a* is keyed to the outer end of shaft **61** in the plane of sprocket **59**. Additionally, a third backlash sprocket **64** is rotatably mounted in the same plane by a bifurcated bearing plate **65** pivotally secured to the shaft **61**. A spring **66** is secured to the outer end of the plate **65** and the top wall to exert a lifting force on plate **65** and maintain tension on chain **63**.

Bevel gears **67** couple the shaft **61** to the quantity drive shaft **68** of the printing unit **11** such that similar records of the dispensed liquid are recorded by the computer unit **7** and the printing unit **11**.

The tension force of spring **66** is designed to exceed the driving torque on the drive shaft **68** such that backlash will be eliminated and an accurate duplication of the computer drive results.

The present invention as shown in FIGS. 1–5 provides a very simple, reliable and rugged means for providing interconnection between a computer and a printing unit with the desirable sequential operation of resetting the printing unit and then the computer such that it is impossible to dispense gasoline without resetting of the printing unit.

An alternative embodiment of the invention is illustrated in FIGS. 8–9 wherein a printing unit **69** is disposed below a computing unit **70** to form a more integral and compact dispensing pump. As in the prior embodiment, the computing unit **70** includes an operating cam **71** interconnected to operate a printing lever **72** in accordance with the previous description of the printing unit. The computing unit **70** includes a reset shaft **73** which is interconnected to be operated as a result of the rotation of the cam **71** in the following manner.

In the second embodiment, a drive sprocket **74** is secured to or bolted to the printing unit cam shaft. A roller chain **75** interconnects the drive sprocket **74** with an idler sprocket **76** to reduce input motion in a ratio of 2 to 1. The idler sprocket **76** is carried by an idler shaft **77** rotatably journalled to the computing unit **70** or any other fixed portion of the assembly. A hub **78** is secured to the idler shaft **77** for simultaneous rotation with sprocket **76**. The periphery of hub **78** is recessed and a coupling pin **79** is secured spanning the recess. An operating arm **80** has a notched end disposed within the recessed periphery and the opposite end is pivotally secured to a computer reset lever **81** as by a pinned connection **82**. Lever **81** is an L-shaped member connected at the junction of its two legs to shaft **73** with a vertically upstanding portion to which the arm **80** is pinned and a horizontal portion extending beneath and parallel to the operating arm **80**. A stop stud **83** threads through an appropriately threaded opening **84** in the horizontal portion of lever **81** and provides a support or stop for the arm **80**.

The stop stud **83** is locked in place by a suitable stop nut **85** secured to the outer end thereof and abutting the underside of the horizontal portion of lever **81**. A spring **86** is secured to the intermediate portion of the operating arm **80** and to a fixed pin **87**, shown as the shaft for printing lever **72**, and resiliently holds the arm **80** in the full line position extending horizontally from the reset lever **81** and engaging the stop stud **83**. The outer end of the arm **80** is provided with a relief or notch **87** on the underside thereof having an angularly related cam surface **88** defined by the vertical wall portion. The notch **87** is located such that the cam surface **88** is aligned with and engaged by the operating or coupling pin **79** when it is rotated to its top position by rotation of the sprocket **86** and attached hub **88**. Further, counterclockwise rotation causes the pin to move along the cam surface **88** forcing the operating arm **80** to the left as viewed in FIG. 8. The spring **86** is sufficiently strong to hold arm **80** down during this movement. This pivots the reset lever **81** and through stud **83** and arm **80**, such that arm **80** rises above pin **79**. The reset lever **81** is allowed to return to the full line position after pin **79** moves below the normal level of arm **80** thereby resets the computer unit **70**.

Generally, the embodiment of the invention illustrated in FIGS. 8 and 9 can be summarized as follows:

The several elements are shown in their relative position during standby and prior to the dispensing operation. As in the first embodiment, a ticket **89** is first inserted within the printing unit tray **90** and the crank, not shown in FIGS. 8 and 9, is turned through a single revolution to reset the printing unit and the computer as follows.

The rotation of the crank rotates cam **71** to reset the printing unit **69** as previously described. The initial rotation similarly drives the hub **78** through the chain drive system and coupling pin **79** moves from the lower position to top dead center at which point it begins to pivot the reset lever **81** through the movement of operating arm **80**.

The drive ratio from meter operating shaft of cam **71** to hub **78** is two to one such that for each complete revolution of the operating crank and cam **71** generates 180 degree rotation or ½ revolution of hub **78**. The printing unit **79**, as in the first embodiment, is reset to zero, the card **89** is locked within the tray **90**, the zero reading is transferred to the card **89** and the tray is then moved outwardly during the first revolution of cam **71**.

During the final portion of the above 180 degree rota-

tion of hub **78**, pin **79** has moved into notch **87** and engages the cam surface **88**. Pin **79** pushes on arm **80** which moves to the left, as viewed in FIG. 8, and causes lever **81** and the attached reset shaft **73** to pivot counterclockwise. Adjustable stop **83** engages the underside of arm **80** and moves it upwardly to disengage notch **87** and pin **79**. The spring tension on lever **81** returns it to the full line position with the underside of arm **80** resting on pin **79**. Computing unit **70** is thereby reset to zero and conditions the dispensing pump **1** for operation.

To remove the ticket or card **89**, the crank **16** must again be turned through a complete revolution in order to release the pin from the card **89**. This also imprints the final reading on the card **89** prior to its release and return of the tray to standby. During this complete revolution, the hub **78** and particularly the attached coupling pin **79** returns to the initial standby position with the components thus returned to the full line position of FIGS. 8 and 9 without actuation of the computer reset lever **81**.

The apparatus of the second embodiment is then in the original position and further operation of the pump **1** requires resetting of the printing unit and the computing unit, as described.

The relief or notch **87** in the operating arm **80** is provided with the inclined cam **88** to provide overload protection. If reset mechanism is inoperable, a damaging force is prevented as the rotation of the pin **79** will overcome the force of spring **86** causing the operating arm **80** to rise on the inclined cam **88** and disengage the coupling pin **70**, as previously described.

The present invention thus provides a rugged, reliable interlocking mechanism for interconnecting the reset mechanism of a ticket printer or similar device and a computing unit. This not only reduces the mechanics of actuating the dispensing system but prevents accidental or fraudulent operation of the system and particularly the producing of printed tickets with a gallonage recorded in excess of that actually dispensed.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

**1.** A dispensing control mechanical interlock unit between a recording means and a computer means forming a part of a dispensing unit interconnected for simultaneous operation from a reference, said recording means including a rotatable reset shaft and said computer means including an oscillatory reset shaft,

a mechanical coupling connected to said recorder reset shaft and to said computer oscillatory reset shaft,

a movable actuating member connected to the said rotatable reset shaft to actuate the coupling, and

a lost motion device forming a part of the coupling and the interconnection of said reset shafts whereby initial movement of the actuating member actuates said recorder reset shaft and final movement of the actuating member actuates said computer reset shaft.

**2.** An interlock unit between a ticket printer and computer comprising:

an opening shaft forming a part of the printer and driving a cam for cyclically actuating the printing mechanism, said cam being a generally spiral cam surface with a recess therein and with a printing arm riding on the cam,

drive means coupling the computer to drive the ticket printer,

a reset lever for the computer, and

a mechanical coupling having a reciprocating member secured by a pin and slot connection to the printing arm for movement of the coupling, said reciprocating member having a stop portion, and a stop member coupled to the operating shaft for cyclical movement with respect to the path of the stop portion of the reciprocating member to selectively control the transmission of movement of the printing arm to the reset lever, said coupling being operable during a first actuation of the printer shaft to sequentially actuate the printer and the computer and during a second actuation actuates only the printer.

**3.** The interlock unit of claim **2** wherein the drive means includes:

an idler shaft rotatably mounted adjacent the printer and coupled thereto by a gear means,

a drive sprocket secured to the idler shaft,

an arm pivotally secured to the shaft,

a tension sprocket rotatably secured in the outer end of the arm,

a drive sprocket secured to the computer, and

a drive chain encircling said sprockets.

**4.** An interlock unit between a ticket printer having an operating shaft coupled to a reset mechanism and to a printing mechanism for cylically resetting the printer counting mechanism to zero and effecting a printing impression movement during a first cyclical actuation of the shaft and effecting a second printing impression without resetting the printer to zero during a second cyclical actuation of the shaft and a computer coupled to drive the printer counting mechanism and having a reset shaft for resetting the computer counting mechanism to zero, said printing mechanism including a cam having a generally spiral cam surface with a recess therein and with a printing arm riding on the cam, said interlock unit including:

a reset lever for connection to the computer reset shaft, and

a mechanical coupling having connected to the printing arm and to the reset lever and having a lost motion mechanism operable during a first actuation of the printing arm to sequentially operate the printing mechanism and reset the computer counting mechanism and during a second actuation operate the printing mechanism and maintaining the computer counting mechanism in the actuated condition.

**5.** An interlock unit between a ticket printer having an operating shaft driving a cam for cyclically resetting the printer to zero and effecting a printing impression movement and then effecting a second printing impression without resetting and a computer coupled to drive the ticket printer and having a reset shaft, said cam being a generally spiral cam surface with a recess therein and with a printing arm riding on the cam, said interlock unit including:

a printing lever having a central pivot support and a follower on one end for control engagement with the printer cam and a slot in the opposite end,

an operating rod having a pin disposed within said slot for rod movement following selected movement of the printing lever and a notched follower at one end,

a computer reset lever having said follower resting thereon,

a spring means secured to the rod and biasing said rod to one end of said slot and the follower into engagement with the reset lever,

a release means for actuation with the computer and arranged to engage the rod and move the rod against the spring means to release the follower from the reset lever, and

interlock means to prevent movement of the computer reset lever.

**6.** In a dispensing system:

a ticket printer having an operating shaft rotating a cam for cyclically effecting a printing impression movement, said cam having a generally spiral cam surface with a recess therein and with a spring loaded printing arm riding on the cam, a computer coupled to drive the ticket printer and having a re-

set shaft, said computer including a dispensing control means whereby the dispensing system is held inoperative until the computer has been reset,

an operating rod secured to the arm at one end by a pin disposed within a slot in the arm for rod movement following selected movement of the arm effective to effect a printing and having a notched follower at the opposite end,

a computer reset lever secured to the reset shaft and having said follower resting thereon for releasable interengagement during reciprocal movement of the rod,

a release means for actuation with the computer and arranged to disengage the rod from the lever, and

interlock means to prevent movement of the operating rod.

7. An interlock unit between a ticket printer and a computer,

an operating shaft forming a part of the ticket printer and driving a cam for cyclically resetting the printer to zero and effecting a printing impression movement and then effecting a second printing impression without resetting thereof, said cam being a generally spiral cam surface with a recess therein and with a centrally pivoted printing arm having one end riding on the cam,

a computer coupled to drive the ticket printer and having a reset shaft,

an interlock lever having a central pivot support and a follower on one end for control engagement with the printer cam and a slot in the opposite end,

an operating rod having a pin disposed within said slot for rod movement following selected movement of the interlock lever and a notched follower at one end,

a computer reset lever having said follower resting thereon,

a spring means secured to the rod and biasing said rod to one end of said slot and the follower into engagement with the reset lever,

a lock member forming a part of the printer and disposed in a release position during a first actuation of the printer operating shaft and to a locking position during the second actuation, and

a stop member secured to the operating rod and movable through the locking position of the lock member whereby said rod is free to operatively move during only the first actuation of the printer operating shaft.

8. An interlock unit between a ticket printer having an operating shaft driving a cam for cyclically resetting the printer to zero and effecting a printing impression movement and then effecting a second printing impression without resetting and a computer coupled to drive the ticket printer and having a reset shaft, said cam being a generally spiral cam surface with a recess therein and with a printing arm riding on the cam, said interlock including:

an operating rod secured to the printing arm by a lost motion connection for rod movement following selected movement of the arm and having a follower at one end,

a computer reset lever having said follower resting thereon,

means secured to the rod and holding said rod in engagement with the reset lever for releasable coupling thereto whereby reciprocating movement of the rod causes the reset lever to oscillate and release itself,

a lock member forming a part of the printer and disposed in a release position during a first actuation of the printer operating shaft and to a locking position during the second actuation, and

a stop member secured to the operating rod and movable through the locking position of the lock member whereby said rod is free to move during the first actuation of the printer operating shaft.

9. In a load recording system:

a ticket printer having an operating shaft driving a cam for cyclically effecting a printing impression movement and a reset mechanism for resetting of the printer every other cyclical operation of the cam,

a computer coupled to drive the ticket printer and having a reset shaft,

a reset lever connected to the computer shaft and including a pair of angularly spaced legs,

an actuating lever pivotally secured to a first of said legs extending over the second of said legs and having a cam surface at the outer end,

stop means secured to the second of said legs and supporting the actuating lever, and

a hub member driven in timed relation with said printer operating shaft and having pin means for engaging the cam surface of the actuating lever and pivoting of the actuating lever and the computer reset lever, said hub member being driven whereby a first revolution of the printer operating shaft sequentially resets the printer and the computer and a second revolution operates only the printer.

10. An interlock unit for coupling a ticket printer and a computer,

an operating shaft of the printer operable to effect a printing impression,

a computer coupled to drive the ticket printer,

a computer reset member, and

a control member driven in timed relation with said printer operating shaft and having a cyclically moving operating means for engaging and actuating the computer reset lever during a first revolution of the printer operating shaft and returning to the original position during a second revolution of the printer operating shaft.

11. The interlock unit of claim 10 wherein:

said control member is rotatably mounted,

transmission means couple said member to said operating shaft for timed rotation, and

coupling pin means are secured to the member for selective timed operative engagement with said reset member.

12. The interlock unit of claim 10 wherein:

said control member is rotatably mounted and includes an operating offset position,

a two to one step-down transmission coupling said control member to the operating shaft, and

a transmission element coupled to the reset member and in the path of the pin and arranged whereby the pin moves past said element during an initial 180 degree rotation of the control member to reset the computer.

13. The interlock unit of claim 12 wherein:

said reset member is an L-shaped member pivotally secured at the junction of the two leg portions,

said transmission element being an elongate member secured to one leg portion and projecting outwardly over the other leg portion, the outer end of the transmission element being slidably supported,

resilient means resiliently urging the element into the path of the pin whereby said pin causes said element to move and pivot said reset member, and

means on said other leg portion engaging said element to lift it against said resilient means and permit said pin to move from operative engagement therewith.

14. The interlock unit of claim 13 wherein:

said element includes an inclined cam surface engaged by the pin for moving the element and whereby the element moves up if the reset member is locked in place.

15. A retail dispensing recording unit, comprising:

a dispensing unit including a computer driven in accordance with a dispensing function and including

a control means for enabling the unit and a reset means to reset the computer to an initial position and to simultaneously actuate the control means and having a transmission shaft driven in accordance with the computer drive,

a printer secured to the dispensing unit in general vertical alignment with the computer and having a operating shaft for a printing unit for generating a permanent record of the printer setting,

a drive system including a driven sprocket secured to the shaft and a gear train connected to the printer and having a drive sprocket rotatably supported on an idler shaft in the plane of the driven sprocket, said system having an idler sprocket rotatably supported in an arm pivotally secured to the idler shaft and a drive chain encircling said sprockets and tension means secured to the arm to load the idler sprocket and eliminate backlash in the transmission system, and



an interlocking mechanism connected to the reset means and to the operating shaft, said mechanism being arranged for cyclical actuation and during a first cycle operating to actuate the printing unit and reset the computer and during a second cycle operating to actuate only the printing unit without reset of the computer.

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