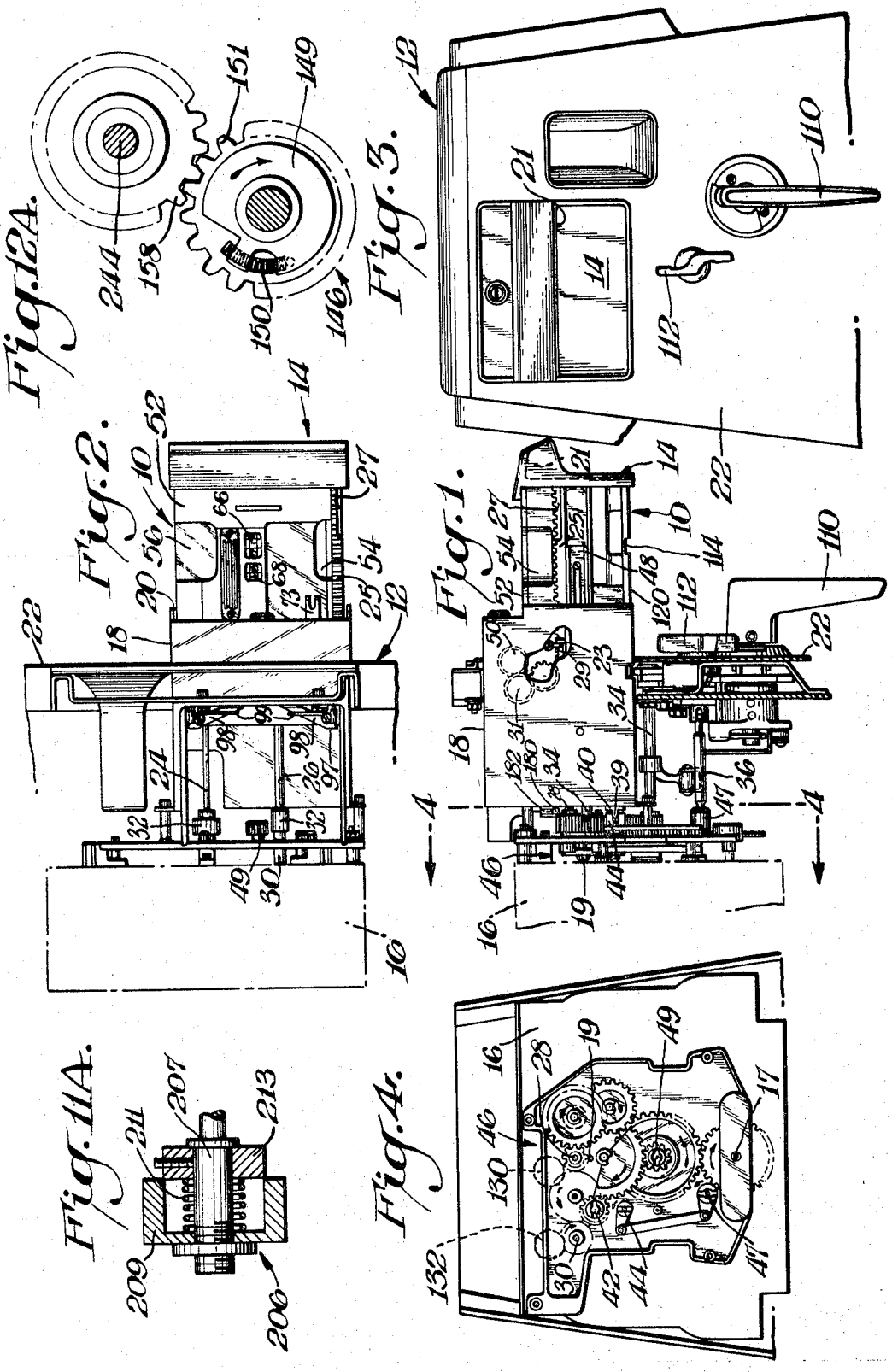
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TICKET PRINTING DEVICE FOR DISPENSER

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TICKET PRINTING DEVICE FOR DISPENSER

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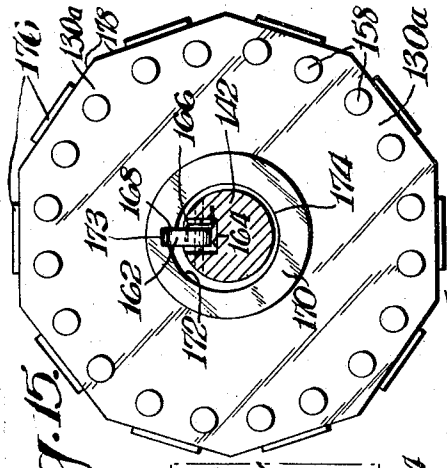


Fig. 15.

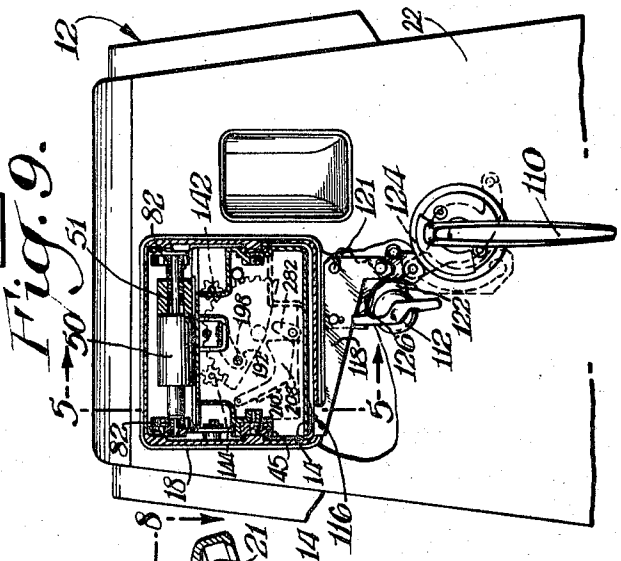


Fig. 9.

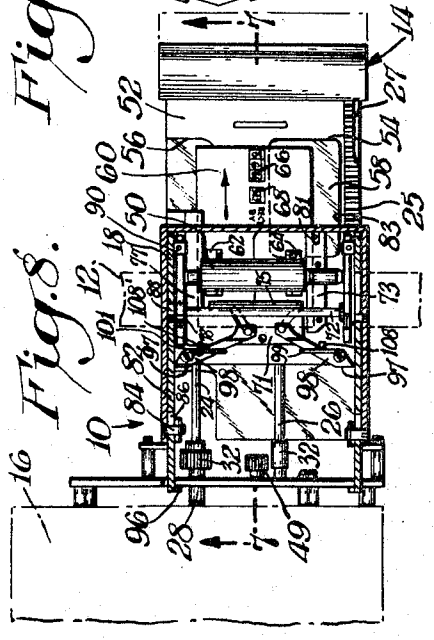


Fig. 8.

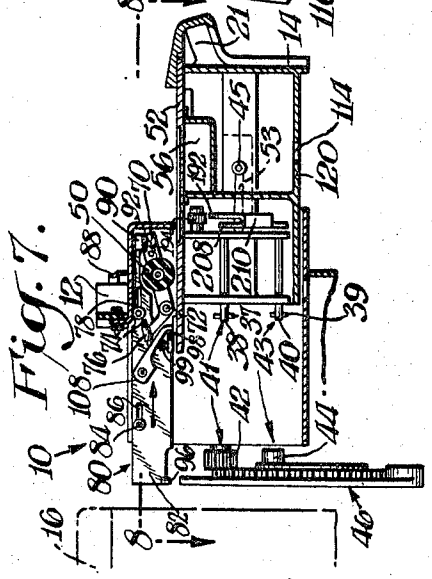


Fig. 7.

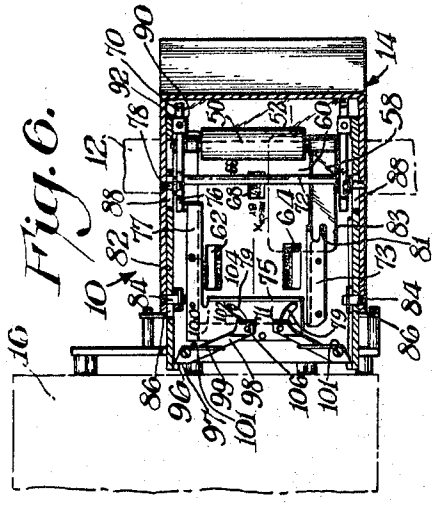


Fig. 6.

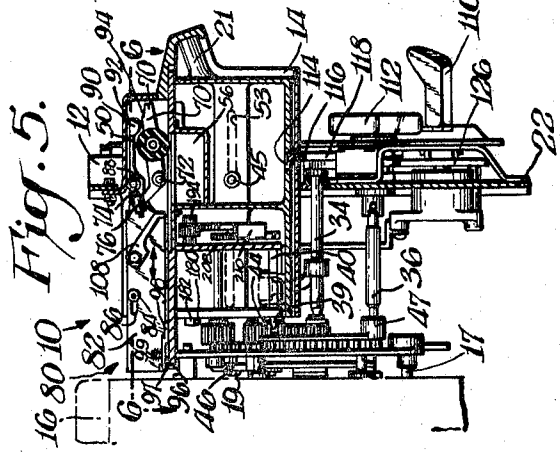
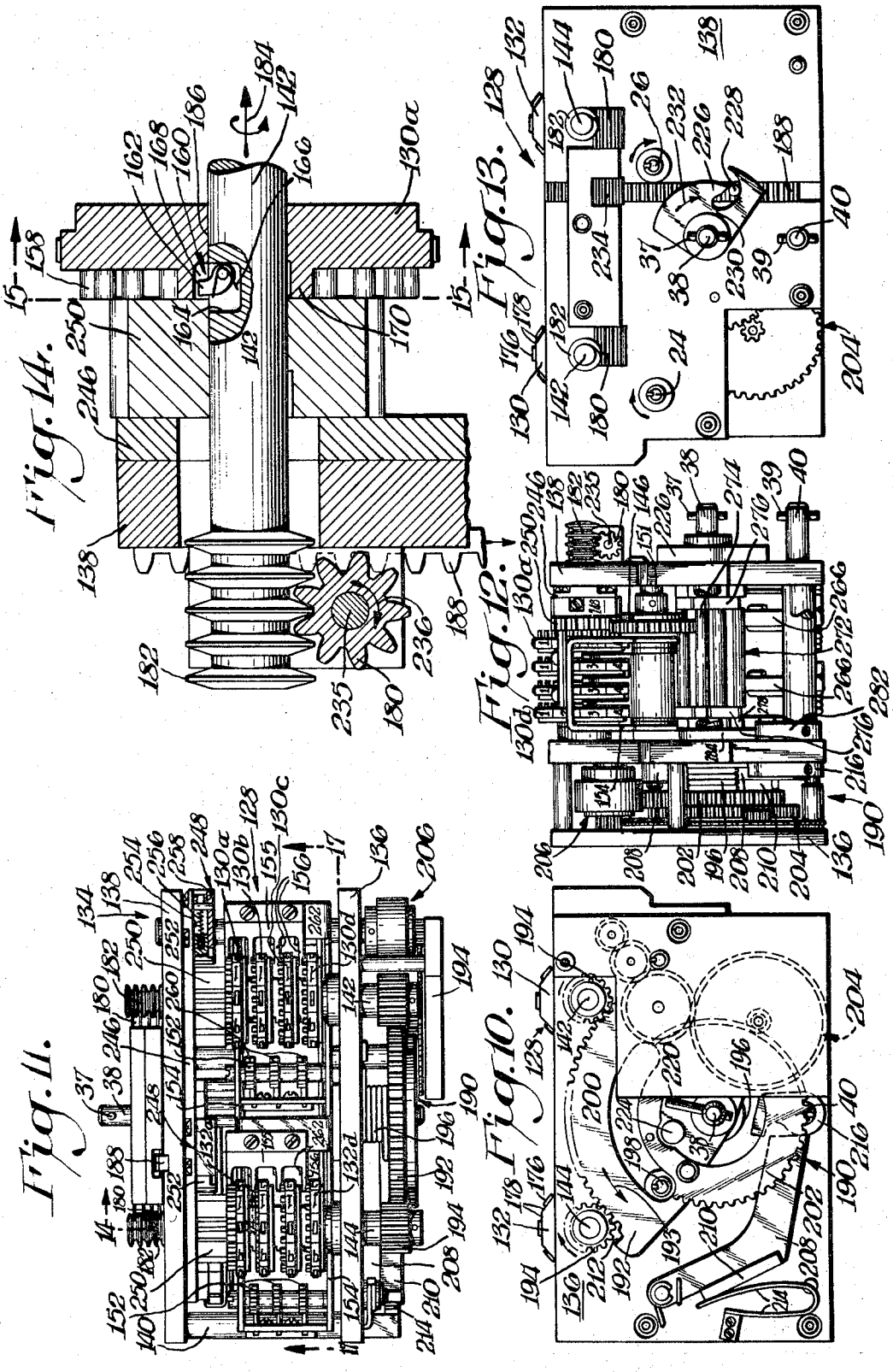


Fig. 5.

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Fig. 16.

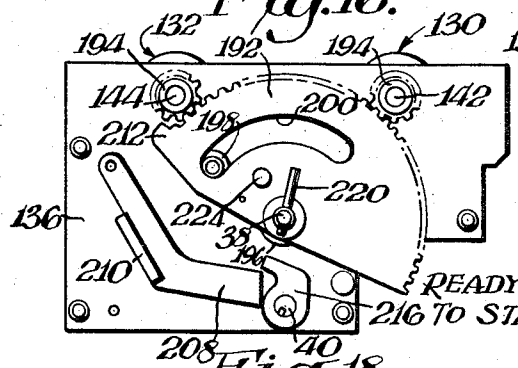


Fig. 17.

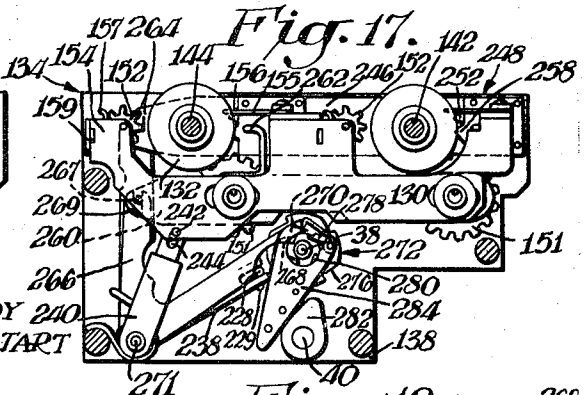


Fig. 18.

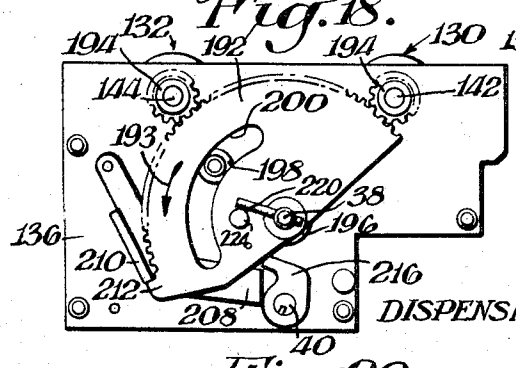


Fig. 19.

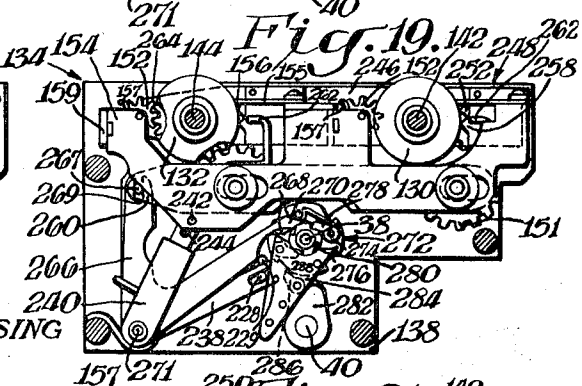


Fig. 20.

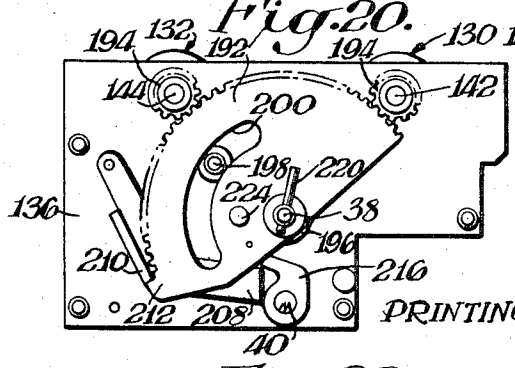


Fig. 21.

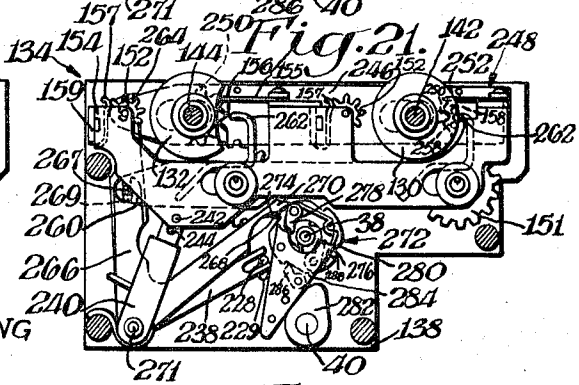


Fig. 22.

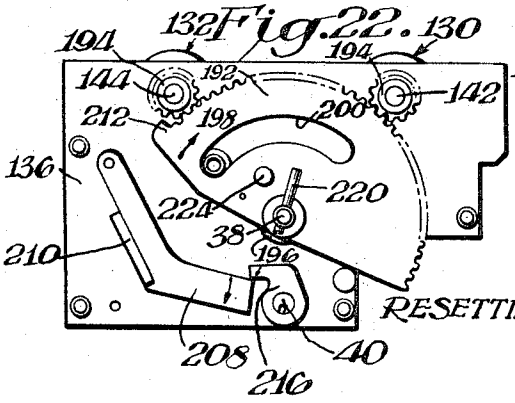
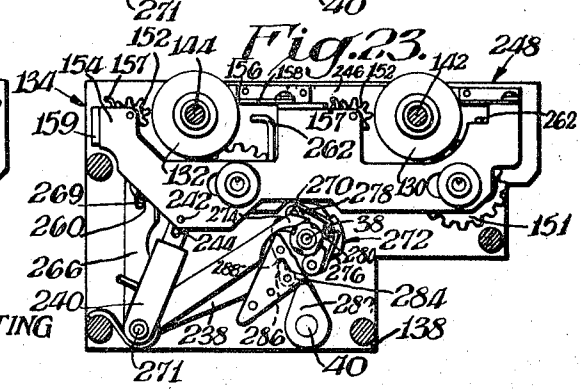


Fig. 23.



United States Patent Office 3,434,155 Patented Mar. 18, 1969

3,434,155

TICKET PRINTING DEVICE FOR DISPENSER

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Filed Sept. 9, 1966, Ser. No. 578,205
U.S. Cl. 346—43 32 Claims
Int. Cl. G01d 15/20

ABSTRACT OF THE DISCLOSURE

Printing device mounted on gasoline dispenser for printing customer credit card and transaction information on multiform ticket. Printing module incorporated in sliding drawer which may be locked within dispenser during operation. Outward movement of drawer presses printing roller against platen. Money and gallon amounts are set into printing module from dispenser. Centering mechanism for last digit printing wheel includes a double wedge device operated by the programming or cycling cam in the printing module. An advantageous programming cam is a bar cage and is rotated in response to movement of the dispenser controls. One-way clutch and resilient connection to printing wheels facilitate centering of lowest order digit before printing.

This invention relates to a ticket printer for providing a record of transactions from a dispensing apparatus and it more particularly relates to such a printer for use in conjunction with a gasoline dispenser and customer credit cards.

Credit card transactions are now highly prevalent in gasoline service station operation. Printing devices are available for mechanically imprinting the customer credit card on tickets or recepits. The amounts and cost of the quantities dispensed must however be laboriously written on the tickets or recepits—thus wasting considerable time and affording a source of error. Various devices have been proposed for automatically printing dispensed amounts and costs on the tickets, but none has proved acceptable for one or more of the following reasons: complication, expense, unadaptability to mass production, poor adjustability, susceptibility to failure and difficulty of maintenance in the field.

An object of this invention is to provide an automatic printing device for use in conjunction with a dispenser which is relatively simple, economical, rugged, dependable, adjustable and easily maintained.

Another object is to provide such a device for use in conjunction with a gasoline dispenser.

In accordance with this invention the printing device is mounted in a movable carriage which is connected to the metering means of the dispenser by a motion-permitting coupling. The carriage preferably slides in and out of an opening in the dispenser casing within which the printing roller means is mounted. The roller is actuated by outward movement of the carriage to imprint the credit card and registering wheels on the ticket. The carriage is thus conveniently made in the form of a drawer which is slid out of the casing for insertion of the ticket and credit card and pushed back into it prior to the dispensing operation—throughout which it is locked within the casing. When the dispensing operation is completed, the carriage is again slid outside out of the casing for removal of the credit card and imprinted ticket.

Such operation is facilitated by mounting the printing roller within the casing upon a movable bracket actuated by a motion-transmitting sliding cam reacting between the carriage and the printing roller. Ticket-sensing feelers

on the carriage activate the motion-transmitting linkage to press the printing roller into contact with the carriage only when a ticket is in place on the platen. The feelers are maintained retracted when the carriage is slid out of the casing to facilitate removal and insertion of tickets. The printing roller is thus maintained out of contact with the platen except when required to print a ticket. The carriage is locked within the casing while the dispenser computer is being reset as well as during the dispensing operation. This prevents a ticket from being altered after it has been inserted into the casing and takes advantage of the existing reset interlock on the dispenser to insure that the registering wheels in the printer are also reset before each dispensing operation.

Novel and advantageous means for centering the lowest order registering wheels are provided by a pair of wedges for engaging the gear spaces about the periphery of the wheels. The wedges are spaced from each other approximately one-half the pitch of the gear spaces and they are movable relative to each other for assuring centering engagement even if one of the wedges should abut upon the edge of a gear element. One of the wedges is accordingly radially and resiliently mounted upon a sliding support to yield and permit the other wedge to accomplish the centering movement if the first should abut.

An advantageous functional assembly for such an automatic ticket printer disengageably mounts the registering wheels upon rotatable shafts.. The registering wheels are connected through one-way clutches to the dispenser output shafts and the registering wheel shafts are connectable to a resetting motor. A programming or cycling cam actuates the movement of centering and locking wedges for the registering wheels.

When the dispenser control is turned "on," the numbered wheels are freely rotated on their shafts by the dispenser computer quantity and cost outputs; and when the dispenser control is turned "off," the programming or cycling cam actuates the centering and locking of the wheels and holds them motionless while the ticket is being printed. The cycling cam disengages the centering and locking wedges from the registering wheels before their resetting movement. The printing assembly is then controlled to connect the resetting motor to the shafts which are then engaged with the numbered wheels to reset them back to zero.

The aforementioned printing assembly is controlled by starting and resetting shafts connected to those in the dispenser. The starting shaft controls the engagement and disengagement of the registering wheels with their shafts and engagement and disengagement of transfer pinions in proper sequence. When a spring-powered resetting motor is utilized, the starting shaft may also wind it in its movement to the "on" position. The programming or cycling cam for controlling the centering and locking of the registering wheels is conveniently operated by a pawl and ratchet drive connected to the starting and resetting shafts. "On" movement of the starting shaft is absorbed by reverse slippage in the drive and "off" movement of the starting shaft centers and locks the registering means to hold them motionless during printing. After printing is completed, actuating movement of the resetting shaft unlocks the registering wheels for rotation and then releases the resetting motor to rest the printing wheels back to zero. The wheels have previously been conditioned, during "off" movement of the starting shaft, for engaging the shafts when they rotate in the resetting direction. The registering wheels may be retarded during their resetting movement to assure engagement of the rotating shafts.

A highly advantageous physical assembly for such a rotating printing device mounts the dollar and quantity registering wheels assemblies upon a pair of parallel rotat-

able shafts. The numbered printing wheels extend through openings in a platen for holding tickets in printing relationship with the wheels. The wheels are connected to the dollar and money output shafts from the dispenser computer through one-way overrunning clutches. These connections may also be resilient to afford a slight backward centering movement of the wheels and sliding to permit movement between the printing assembly and dispenser. The resetting motor is conveniently mounted upon the rear of the printing assembly and the transfer pinions, centering and locking wedges are mounted upon slides. The programming or cycling cam is mounted parallel to the registering wheel shafts and actuates the slides for centering and locking the registering wheels through followers. It is driven by a pawl and ratchet drive actuated by the movement of the dispenser starting and resetting shafts.

The registering wheels are conveniently disengageably connected to their shafts by pawls which are resiliently mounted in recesses in the shafts and alternatively inserted within smooth circular and shouldered hubs in the wheels. The pawls are respectively engaged with the shouldered holes and disengaged from the hubs by insertion within their smooth circular holes by a reciprocating movement actuated by the starting shaft conveniently through a rack and pinion. The programming or cycling cam is conveniently made in the form of a bar cage which is rotatably mounted upon the starting shaft. It is rotated by a pawl and ratchet drive in response to movement of the starting and resetting shafts.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a side view in elevation of one embodiment of this invention connected to a gasoline dispenser;

FIG. 2 is a plan view of the embodiment shown in FIG. 1;

FIG. 3 is a side view in elevation of the outside of the dispenser to which the embodiment shown in FIG. 1 is connected;

FIG. 4 is a cross-sectional view taken through FIG. 1 along the line **4—4**;

FIG. 5 is a cross-sectional view taken through FIG. 9 along the line **5—5**;

FIG. 6 is a cross-sectional plan view taken through FIG. 5 along the line **6—6**;

FIG. 7 is a cross-sectional view similar to FIG. 5 with the carriage of the printer in the withdrawn or extended position and taken through FIG. 8 along the line **7—7**;

FIG. 8 is a cross-sectional plan view taken through FIG. 7 along the line **8—8**;

FIG. 9 is a side view in elevation similar to FIG. 3 partially broken away in cross section;

FIG. 10 is a front view in elevation of the printing mechanism in the carriage of the embodiment shown in FIGS. 1–9;

FIG. 11 is a plan view of the mechanism shown in FIG. 10;

FIG. 11A is a cross-sectional view in elevation of the flywheel portion of the mechanism shown in FIG. 11;

FIG. 12 is a right side view in elevation of the mechanism shown in FIGS. 10 and 11;

FIG. 12A is a cross-section view in elevation of an input coupling portion of the mechanism shown in FIG. 12;

FIG. 13 is a rear view in elevation of the mechanism shown in FIGS. 10–12;

FIG. 14 is a cross-sectional view taken through FIG. 11 along the line **14—14**;

FIG. 15 is a cross-sectional view taken through FIG. 14 along the line **15—15**;

FIG. 16 is a front view in elevation of resetting portions of the mechanism shown in FIG. 10 in the initial phase of operation before the dispenser is started;

FIG. 17 is a cross-sectional view taken through FIG. 11 along the line **17—17** in the phase of operation shown in FIG. 16;

FIG. 18 is a front view in elevation similar to FIG. 16 in the dispensing phase of operation;

FIG. 19 is a cross-sectional view similar to FIG. 17 in the dispensing phase of operation shown in FIG. 18;

FIG. 20 is a front view in elevation similar to FIGS. 16 and 18 in the printing phase of operation;

FIG. 21 is a cross-sectional view similar to FIGS. 17 and 19 in the printing phase of operation shown in FIG. 20;

FIG. 22 is a front view in elevation similar to FIGS. 16, 18 and 20 in the resetting phase of operation; and

FIG. 23 is a cross-sectional view similar to FIGS. 17, 19 and 21 in the resetting phase of operation shown in FIG. 22.

DESCRIPTION OF FIGS. 1–9

In FIGS. 1–3 is shown a printing device **10** connected to dispenser **12** for recording total amounts dispensed, total cost and customer identification. Printing device **10** includes carriage **14** connected to receive inputs from the metering or computing means **16** of dispenser **12** and mounted to move in and out of opening **20** in receptacle **18** conveniently mounted within casing **22** of dispenser **12**. The compact structure of device **10** facilitates its space-saving insertion within the portion of dispenser **12** between computer **16** and casing **22**.

Carriage **14** is connected to computer **16** and operative portions of dispenser **12** through four movable connections. These four movable connections include two permanently connected sliding shafts **24** and **26** shown in FIGS. 2, 4 and 8. Sliding shaft **24** is connected to gallon shaft **28** on gearing assembly **46** (shown in FIG. 1) and sliding shaft **26** is connected to dollar shaft **30** of gearing assembly **46**. Computer gallon shaft **17** and dollar shaft **19** are shown in FIG. 1 connected to the input side of gear assembly **46**. Sliding shafts **24** and **26** are respectively connected to shafts **28** and **30** through one-way overrunning clutches **32** for permitting gallon and dollar shafts **24** and **26** to carriage **14** to run freely ahead of respective computer input shafts during the resetting operation later described in detail.

The other two movable connections from carriage **14** to computer **16** are made as shown in FIGS. 1, 4 and 7 from dispenser starting shaft **34** and coupling **49** to slotted coupling **42** for connection to printer starting shaft **38**. Dispenser resetting shaft **36** shown in FIG. 1 is connected to coupling **47** and slotted coupling **44** shown in FIGS. 4 and 7 for connection to printer resetting shaft **40**. The starting and resetting shaft inputs to carriage **14** are introduced (as shown in FIGS. 5 and 7) through disengageable tanged couplings **41** and **43** to printer starting shaft **38** and printer resetting shaft **40**. Tangs **37** and **39** respectively extend through shafts **38** and **40**. Tanged couplings **41** and **43** also include slotted sleeves **42** and **44** shown in FIG. 7. Gear assembly **46** (shown in FIGS. 1 and 5) is mounted on the side of computer **16**. In FIG. 7 starting and resetting shaft couplings **41** and **43** are shown broken, which occurs when carriage **14** is withdrawn or extended. Starting shaft coupling **41** and resetting shaft coupling **43** are engaged in the inserted position of carriage **14** shown in FIGS. 5 and 6.

In the illustrated embodiment, carriage **14** is mounted on telescopic drawer slides **48** shown in FIG. 1 to slide carriage **14** in and out of opening **20** like a drawer. Drawer **14** is grasped by hooking up into handle recess **21** shown in FIGS. 1 and 3. Pawl **23** loosely engages within rack **25** in the sides of drawer **14** above slides **48** to enforce complete inward or outward movement of drawer **14** during each movement. It is therefore a full stroke device and the inclination of pawl **23** does not permit reverse movement until it is engaged in openings **27** and **29** re-

spectively in the front and back of rack **25**. A train of gears **31** shown in FIG. 1 connects rack **25** with printing roller **50** to cause it to move at the same surface speed as ticket-receiving platen **52** and a ticket inserted upon it. This prevents ticket **60** from being buckled when printing roller **50** moves in firm contact across it. Printing roller **50** is rotatably mounted through one-way clutch **51** (shown in FIG. 9) to compel rotation only in the printing direction. Drawer **14** is easily removed together with the later-described printing mechanism contained in it by removal of cap screws **45** extending through slots **53** in drawer slides **48**.

All of the registering mechanism of the printer is mounted within carriage **14**. The print-effecting device, namely printing roller **50**, is mounted as shown in FIGS. 1 and 5–9 within casing **22** adjacent ticket-supporting platen **52** of carriage **14**. Ticket-supporting platen **52** includes side cutouts **54** and **56** to facilitate insertion and removal of credit card **58** and ticket **60** shown in FIGS. 6 and 8. Ticket **60** is for example of the multiple type interleaved with carbon. It is imprinted after completion of the dispensing operation with the information transmitted to the printable registering wheels of carriage **14** later described in detail. The registering wheels extend through openings in platen **52** which are disposed under total gallons block **62** and total charge block **64** on ticket **60**. The date and price blocks **66** and **68** are printed by manually-adjustable wheels. The gallon and cost printing wheels are driven by the dispenser computer through the aforementioned shafts and as later described in detail.

In FIG. 6 are shown spring guides **71** and **73** for holding ticket **60** and credit card **58** in position upon platen **52**. Leaf spring guide **71** is L-shaped and includes a spaced rear section **75** having an upwardly inclined edge for receiving the rear end of ticket **60**. Guide spring **71** is anchored to platen **52** by side leg **77**. Rear section **75** includes slots **79** to permit guide lugs **106** on ticket-sensing levers **98** to extend through them. Spring finger **73** has a forked tip **81** for holding credit card **58** firmly in place on platen **52** in a suitable recess **83** provided in platen **52** for receiving credit card **58**.

Printing roller **50** is for example of the permanently inked type for recording the information from the carriage printing wheels on the upper surface of multiple ticket form **60** as well as on the inner leaves. It is mounted upon movable bracket **70** in a manner which maintains it out of contact with the ticket supporting surface or platen **52** except when a ticket **60** is inserted and carriage **14** is being moved in the printing direction. Carriage **14** actuates printing when it is being moved out receptacle **18** and casing **22**. Bracket **70** is accordingly rotatably mounted within receptacle **18** upon axis of rotation **72**. Compression spring **74** in foot extension **76** of bracket **70** reacts against pin **78** in a direction to urge printing roller **50** away from platen **52**.

Motion-transmitting sliding cam **80** shown in FIGS. 5–8 reacts between carriage **14** and printing roller bracket **70** to move printing roller **50** into contact with platen **52** during the outward or withdrawing movement of carriage **14**. Sliding cam assembly **80** includes a pair of bars **82** mounted to slide back and forth within the top of the sides of receptacle **18** on pins **84** and **78** extending through slots **86** and **88** in bars **82**. The outer ends **90** of bars **82** include adjustable camming elements, namely set screws **92**, for contacting the upper camming surface **94** of brackets **70**. When slide bars **82** are shoved back as shown in FIGS. 5 and 6, set screws **92** force the end of bracket **70** and printing roller **50** downwardly toward platen **52**. When drawer or carriage **14** is pulled out as shown in FIGS. 7 and 8, bars **82** are pulled outwardly to release printing roller bracket **70**. This allows springs **74** to move printing roller **50** away from contact with platen **52**. This release is accomplished at the end of the outward movement of carriage **14** after the information on the registering portions of carriage **14** has been imprinted upon ticket **60** during the outward movement of drawer **14**.

As previously mentioned, printing roller **50** is only forced into contact with platen **52** when a ticket **60** is placed upon it. This is accomplished by cooperating projection means in the connection between carriage **14** and sliding cam **80** provided by inwardly extending lugs **96** on slide bars **82** (shown in FIGS. 6 and 8) in conjunction with the shorter ends **97** of ticket-sensing levers **98** mounted upon platen **52**. Levers **98** are resiliently urged by torsion springs **99** toward the ticket-supporting portion **100** of platen **52** designated by the outline of ticket **60** in FIGS. 6 and 8. The inner ticket-contacting ends **102** of levers **98** are guided to move within slots **104** in platen **52** by inserted guide pins **106**, which also extend through slots **79** in rear spring guide section **75**.

The cooperating projection means also includes hooks **108** which engage front surfaces **101** on levers **98** when they are moved forward thereby maintaining them retracted from the ticket-supporting portion **100** of platen **52** when carriage **14** is fully pulled out of receptacle **18**. This facilitates insertion and replacement of ticket **60** by keeping levers **98** retracted away from ticket-receiving surface **100**.

The operation of dispenser **12** is controlled in the conventional manner by dispenser starting lever **110** and computer resetting knob **112**. Printer **10** is arranged to coordinate its operating cycle with that of the dispenser. Dispenser **12** cannot operate until carriage **14** is fully inserted within it and when the dispensing or resetting operations of dispenser **12** are being accomplished, carriage or drawer **14** cannot be pulled outside of receptacle **18** and casing **22**. This is accomplished by interlocking carriage **14** with operating linkages connected to dispenser starting handle **110** and computer resetting knob **112**. The interlock includes recess **114** (shown in FIGS. 5 and 7) in the bottom of drawer **14** within which end **116** of interlocking link **118** (shown in FIGS. 5 and 9) is inserted.

When carriage **14** is removed from casing **22**, as shown in FIG. 7, end **116** of lever **118** abuts unbroken bottom surface **120** of drawer **14**. This prevents operative movement of starting handle **110** and resetting knob **112**. When drawer **14** is inserted within receptacle **18** (as shown in FIG. 5) and either starting handle **110** or resetting knob **112** is rotated, end **116** of interlocking lever **118** is inserted into recess **114** to lock drawer **14** within receptacle **18**. It is then impossible to tamper with a ticket or the printing wheels while the dispensing or resetting operations are being accomplished. Interlocking lever **118** is rotatably mounted upon pivot pin **121**, and it is actuated by link **122** connected to resetting knob **112** and link **124** connected to starting handle **110**. Link **124** is connected to interlocking link **118** through intermediate link **126**. The connections from dispenser starting handle **110** and resetting knob **112** to operative portions of the dispenser and computer are not shown, and may be of a conventional nature.

DESCRIPTION OF FIGS. 10–23

The registering mechanism **128** in carriage **14** is shown in FIGS. 10–23. Mechanism **128** (shown in FIGS. 10–14) includes numbered printable registering wheels **130***a*, *b*, *c* and *d* for registering gallons and wheels **132***a*, *b*, *c* and *d* for registering total cost. Registering wheels **130***a* and **132***a* are for the lowest order digits and the others are for the higher order digits. Registering wheel assemblies **130** and **132** are rotatably mounted in frame **134** including front plate **136** and rear plate **138** which are held together by a series of posts **140**.

Numbered wheel assemblies **130** and **132** are rotatably mounted upon additionally rotatable shafts **142** and **144**. Shafts **142** and **144** accordingly extend through bearings in plates **136** and **138**. Printing wheel assemblies **130** and **132** are connected to printing mechanism dollar and gallon shafts **24** and **26** through resilient connections **146** and gears **158**. Resilient connections **146** (shown in FIGS. 12 and 12A) complete their drive connection through input flange **149**, spring **150** and geared output flange **151** which

afford a partial turn rearward for accomplishing centering movement as later described in detail. The drive from lowest order registering wheels **130***a* and **132***a* to the higher order wheels is completed through transfer pinion gear assemblies **152** of a conventional type. Transfer pinion gear assemblies **152** are mounted upon yoke slides **154** which slide laterally back and forth in a manner later described for moving transfer pinion gear assemblies from the disengaged position shown in FIGS. 11 and 17 to the engaged position shown in FIG. 19.

Spring hands **155** including fingers **156** are mounted upon the portions of yoked slides **154** adjacent printing wheels **130** and **132** on the opposite sides from transfer pinion gear assemblies **152**. Spring fingers **156** engage gear pegs **158** (shown in FIG. 14) around the side peripheries of registering wheel assemblies **130** and **132** when transfer gear pinion assemblies **152** are disengaged. This prevents printing wheels **130** and **132** from inadvertently being dragged out of position when shafts **142** and **144** rotate freely within them during winding of the resetting motor later described.

Numbered wheel assemblies **130** and **132** are disengageably connected to shafts **142** and **144** by disengageable projection means **160** shown in FIG. 14. Disengageable projection means **160** include hooked pawls **162** rotatably mounted in slots or recesses **164** in shafts **142** and **144** for each wheel **130** and **132**. Pawls **162** are resiliently urged outwardly from recesses **164** by torsion springs **166**. Pawls **162** engage shoulders **168** in the hubs of registering wheels **130** and **132**, represented in FIGS. 14 and 15 by lowest order registering wheel **130***a*. Shoulder **168** in hub **170** of wheel **130***a* on one side of pawl **162** has substantial depth for causing pawl **162** to transmit clockwise rotation to wheel **130***a* looking in the direction of FIG. 15 during the resetting rotation of shaft **142**. The other side **172** of shouldered opening **174** in hub **170** is inclined and cut out almost to the full height of pawl **162** to help pawl **162** rotate freely within opening **174** up to shoulder **168**, which corresponds to the zero position of wheel **130***a*. The low step **173** in inclined side **172** prevents wheel **130***a* from drifting clockwise relative to pawl **162** looking in the direction of FIG. 15. FIG. 15 also shows numbers **176** on flats **178** about the periphery of wheel **130***a*. The zero number **176** is disposed radially in alignment with shoulder **168**. Pegs **158** extend from the side periphery of wheel **130***a* to provide gear spaces for engagement of transfer pinion gears **152**.

As shown in FIG. 14, shaft **142** and also shaft **144** (not shown) are moved axially by pinion **180** and circular rack **182** (in a manner later described) to push shaft **142** in the direction of arrow **184**. This pushes pawl **162** into the smooth circular portion **186** of wheel hub **170** to free wheel **130***a* from shaft **142**. Spring **166** maintains pawl **162** urged outwardly toward hub **170**. When shaft **142** is moved axially backwardly, pawl **162** is conditioned for reengagement with shoulder **168** when wheel **130***a* rotates it into registery with pawl **162** during its resetting movement. Rotation of pinion **180** is accomplished by upward and downward movement of straight rack **188** as later described.

Shafts **142** and **144** are rotated for resetting numbered wheel assemblies **130** and **132** to zero by resetting motor **190** mounted upon the front of frame **134** as shown in FIGS. 10, 11 and 12. Resetting motor **190** includes gear segment **192** engaged with spur gears **194** on the ends of shaft **142** and **144**. Gear segment **192** is connected to torsion spring **196** which reacts rotationally against it. Resetting motor **190** is therefore a spring-operated motor. Pin **198** in arcuate slot **200** in gear segment **192** positively limits its travel. Auxiliary gear segment **202** is attached to main gear segment **192** for transmitting motion through gear train **204** to flywheel assembly **206** shown in FIG. 11. Flywheel assembly **206** retards the resetting motion of shafts **142** and **144** to insure angular engagement of pawls **162** against shoulders **168** in the hubs of numbered wheel assemblies **130** and **132**. As shown in FIG. 11A, flywheel assembly **206** includes an input shaft **207** which is frictionally connected to flywheel ring **209** by pressure spring **211** which reacts between ring **209** and collar **213**. Flywheel assembly **206** thus also is an energy absorber.

Gear segment **192** is locked in its fully wound position (as later described) by latching lever **208** including latching bar **210** under which extension **212** of gear segment **192** blocks. Leaf spring **214** urges latching lever **208** toward engagement with latching extension **212**. Latching lever **208** is moved in the releasing direction by hooked lever **216** mounted upon resetting shaft **40** and operated in a manner later described. Resetting motor **190** is cocked by driving contact of pin **220** through starting shaft **38** after pin **220** takes up the space shown in FIG. 10 between it and peg **224** in gear segment **192** as later described in detail.

FIG. 13 shows the rear of printing mechanism **128** and its operative connections to dispenser **12** including starting shaft **38** and resetting shaft **40**. Tangs **37** and **39** extend through shafts **38** and **40** to form parts of couplings **41** and **43** (previously shown in FIG. 7). Starting shaft **38** moves straight rack **188** also shown in FIG. 14 downwardly and upwardly through cam plate **226**. Follower pin **228** attached to straight rack **188** engages in curved slot **230** in cam plate **226**. Clockwise rotation of cam **226**, in the direction of arrow **232** in FIG. 13, pulls rack **188** downwardly to rotate intermediate pinion **34** and end pinions **180** all connected to pinion shaft **235** in a clockwise direction. This rotates pinion **180** shown in FIG. 14 clockwise in the direction of arrow **236** against circular rack **182** to push shaft **142** in the direction of arrow **184**. Clockwise or "on" movement of starting shaft **38** shown in FIG. 13, thus disengages shafts **142** and **144** from numbered wheel assemblies **130** and **132**.

Yoked transfer gear pinion slide **154** shown in FIGS. 11, 12 and 17 is operated by an inner extension of pin follower **228** through slot **229** shown in FIG. 17 engaging in slotted arm **238**. Arm **238** is connected to arm **240** which engages slide **154** through pin **242** extending through slot **244** in arm **240**. Movement of pin **228** downwardly accordingly moves slide **154** to the right from its position shown in FIG. 17 to that shown in FIG. 19 to engage transfer gear pinions **152** with the spaces between pegs **158** about the periphery of numbered wheel assemblies **130** and **132**. At the same time spring hands **155** are also moved to the right upon slide **154** to disengage spring fingers **156** from the spaces between pegs **158** as shown in FIG. 19. The sequence for such operations is later described in detail.

There are two more slides for actuating the operation of printing mechanism **128**, which are shown in FIGS. 11, 12 and 17. Lowest order wheels centering and locking slides **246** is mounted adjacent rear frame plate **138**. A pair of centering and locking wedge assemblies **248** are mounted on slides **246** for centering and then locking gears **250** connected to lowest order printing wheels **130***a* and **132***a*. Centering and locking wedge assemblies **248** include a movable wedge **252** radially mounted with respect to gears **250**. Wedge **252** (shown in FIG. 11) is movable within slot **254** and is resiliently urged toward gear **250** by compression spring **256**.

The outer casing **258** of centering wedge assembly **248** (shown in FIGS. 17, 19, 21 and 23) forms a stationary centering wedge spaced one-half the pitch of gear **250** below movable wedge **252**. If movable wedge **252** should abut upon the edge of a tooth of gear **250**, it yields resiliently to allow fixed wedge **258** to enter inbetween the adjacent teeth or gear **250** to nudge them away from abutment with movable wedge **252**. Movable wedge **252** then centers and locks gear **250**. This insures that centering wedge assembly **248** always centers the lowest order printing wheels **130***a* and **132***a* even if primary wedge **252** initially hits the edge of a tooth. This centering movement is necessary to insure the printing of whole numbers on

ticket **60** to avoid all controversies concerning the amounts printed, particularly total cost.

The last slide in printing mechanism **128** is inner yoke **260** from which hooked fingers **262** (shown in FIG. 17) extend for engaging inbetween pegs **159** extending laterally from the peripheries of numbered wheel assemblies **130** and **132**. Hooked fingers **262** lock the higher order printing wheels **130***b*, *c* and *d* and **132***b*, *c* and *d* during the printing operation as later described. Slides **246** and **260** are moved laterally by bell crank levers **264** and **266**, which are respectively connected to cam follower levers **268** and **270** shown in FIG. 19. Only a portion of follower lever **268** is shown because it is behind lever **270** in FIGS. 17, 19, 21 and 23. Follower levers **268** and **270** engage programming cam assembly **272** shown in FIGS. 12 and 17 for actuating movement of centering and locking slides **246** and **260** in proper sequence as later described in detail.

Programming cam assembly **272** is a cycling cam and it includes a cage of bars **274**, extending between front and rear flanges **276**, which are rotatably mounted about starting shaft **38** as shown in FIGS. 12 and 17. The ends of follower levers **268** and **270** alternately ride upon the outsides of bars **274** and drop into the spaces between them for actuating their slides in proper sequence. Rotation of cage of bars **274** is accomplished by engagement of pawls **278** rotatably mounted on bars **274** under inclined ratchet teeth **280** around an aligned portion of starting shaft **38**. During the "on" movement of starting shaft **38** counterclockwise (as shown in FIG. 17) pawls **278** allow backwardly-inclined teeth **280** to ride under them. When starting shaft **38** is turned clockwise in the "off" direction (from FIG. 19 to FIG. 21), ratchet teeth **280** engage pawls **278** to rotate bar cage cam **272** clockwise (for example through 70°) to actuate cycling movement of the character later described.

Programming cam **272** is also operated in response to movement of resetting shaft **40** to which lobed cam **282** is attached. Rotation of resetting shaft **40** counterclockwise to the position shown in FIG. 23 nudges ratcheting lever **284** carrying pawl **286** clockwise (for example through 20°). Pawl **286** engages in notches **288** about the periphery of bar cage flange **276** to complete the 90° cycle of rotation of programming cam **272** in the sequence later described.

OPERATION

The sequence of operation of device **10** including printing mechanism **128** is illustrated in successive pairs of FIGURES 16–17, 18–19, 20–21 and 22–23. The following is a tabulation of the relationship of the aforementioned pairs of figures to the different aspects of the operative cycle of printing mechanism **128**.

FIGURES:	Phase of operation
16–17	Prior to dispensing and before operation of dispenser starting handle.
18–19	During dispensing operation.
20–21	During printing operation.
22–23	During resetting operation.

Before dispensing

Before the dispensing operation, drawer or carriage **14** is pulled out (as shown in FIGS. 1 and 2) for insertion of ticket **60** and credit card **58** upon platen **52** in the positions shown in FIG. 8. Ticket-sensing levers **98** are maintained retracted away from ticket receiving area **100** by hooks **108** which engage front surfaces **101** of levers **98**. At this time neither starting handle **110** nor resetting knob **112** can be operated because end **116** of interlocking lever **118** is blocked by the bottom surface **120** of carriage **14**.

Drawer **14** carrying ticket **60** and credit card **58** is then pushed into receptacle **18** and casing **22** to the position shown in FIGS. 5 and 6. Starting handle **110** can then be rotated to start the dispensing operation and the pumping of gasoline because end **116** of interlocking lever **118** moves into recess **114** in the bottom **120** of drawer **14** as shown in FIG. 5. This prevents drawer **14** from being pulled out during the dispensing operation.

Printing roller **50** is maintained out of contact with platen **52** and ticket **60** upon it during most of the inward movement of drawer **14**. It is only when outer ends **97** of ticket-sensing levers **98** pick up lugs or projections **96** on slide bars **82** that sliding cam assembly **80** forces printing roller **50** down into contact with platen **52**. This prepares it to effect printing when drawer **14** is pulled out.

Before starting handle **110** (shown in FIGS. 1, 3, 5 and 9) is rotated to start the dispensing operation, printing mechanism **128** is in the condition shown in FIGS. 16 and 17. Printer starting shaft **38** then also is in its unactuated condition. Shafts **142** and **144** are engaged with numbered wheel assemblies **130** and **132** in the manner shown in FIGS. 14 and 15. Transfer gear pinions **152** are disengaged from gear pegs **158** about the periphery of numbered wheel assemblies **130** and **132**, and yoked transfer pinion slide is accordingly in its left-hand position in FIG. 17. Centering and locking wedge assemblies **248** on slide **246** are in their right-hand extremity of movement in FIG. 17 with wedges **252** and **258** disengaged from numbered wheel assemblies **130** and **132**. Hooked fingers **262** on slide **260** are also to the right and disengaged from numbered wheel assemblies **130** and **132**. This is the condition that exists after printing mechanism **128** has been reset, which is the last part of the cycle herein described.

When starting handle **110** is actuated, printer starting shaft **38** is rotated counterclockwise as illustrated in FIGS. 10, 18 and 19. As shown in FIG. 13, this rotates cam plate **226** in a direction of arrow **232** to push pin **228** and its straight rack **188** downwardly. This rotates pinions **180** (as shown in FIG. 14) in the direction of arrow **236** to push shaft **142** inwardly to the right. This disengages pawl **162** from the shouldered portion of hub **170** of wheels **130** and **132** and inserts it within smooth circular portion **186**.

As shown in FIG. 19, the inward extension of pin **228** has moved downwardly in slot **229** to rotate lever **238** and attached bell crank lever **240** clockwise. This moves slide **154** carrying transfer pinions **152** into engagement with numbered registering wheel assemblies **130** and **132**. Spring fingers **156** are then disengaged from numbered wheels **130** and **132**.

In FIG. 18 starting shaft **38** has been rotated far enough to fully rotate resetting gear segment **192** through drive peg **224** in the direction of arrow **193**. This winds and cocks resetting motor **190**. The aforementioned disengagement of shafts **142** and **144** from numbered wheels **130** and **132** and the engagement of transfer gear pinions **152** therewith is accomplished before resetting motor **190** is wound because of the initial clearance between pin **220** and drive peg **224** shown in FIG. 16. In FIG. 18, pin **220** has fully wound resetting spring **196** and latched projection **212** of gear segment **192** under latching bar **210** on latching lever **208**. This prepares motor **190** for its subsequent resetting operation. During the winding of spring **196**, shafts **142** and **144** are rotated through spur gears **194**, but shafts **142** and **144** are disengaged from numbered wheel assemblies **130** and **132** and held motionless by engagement of transfer gear pinions **152**, which provide enough resistance to prevent numbered wheels from being dragged out of the zero position shown in FIG. 11 by the rotation of shafts **142** and **144** within them while resetting motor **190** is being wound.

During rotation of starting shaft **38** from the position shown in FIG. 17 to that shown in FIG. 19, programming cam **272** is not actuated because ratchet teeth **280** on shaft **38** slide freely under pawls **278** on bar cage flanges **276**. This conditions the programming cam for opera-

tion when handle **110** and starting shaft **38** are moved into "off" direction.

Dispensing

During the dispensing operation, gallons shaft **28** and dollar shaft **30** from computer **16** shown in FIG. 1 provide a rotational input which is counterclockwise to printer gallon shaft **142** and dollar shaft **144** viewed in the direction of FIG. 9. As shown in FIG. 2, the gallon and dollar rotational inputs are fed through one-way overrunning couplings or clutches **32** and sliding gallon and dollar shafts **24** and **26** to printing mechanism **128** in drawer **14**. These inputs are connected through resilient connections **146** (one of which is shown in FIG. 12) to spur gears **158** connected to the lowest order registering wheels **130***a* for gallons and **132***a* for cost. Transfer pinion gears **152** connect lowest order registering wheels **130***a* and **132***a* to higher order registering wheels **130***b*, *c*, and *d* and **132***b*, *c* and *d*.

Before printing

When starting shaft **38** is moved in the "off" direction (clockwise in FIGS. 16–23) ratchet teeth **280** engage and drive pawls **278** and attached bar cage assembly **272** clockwise from the position shown in FIGS. 17 and 19 to the position shown in FIG. 21 in which it has been rotated 70°. Follower levers **268** and **270** are then raised in the recited sequence by the rotation under them of a bar **274**. Lever **268** is raised first because its actuating portion is slightly closer to its pivot **271** than lever **270**. This causes slide **246** to be pulled to the left by counterclockwise rotation of bell crank lever **264** to the position shown in FIG. 21. Centering and locking wedge assemblies **248** then are engaged with gears **250**. This first centers and then locks lowest order registering wheels **130***a* and **132***a* to prevent controversy about the printed gallonage and cost. The movable mounting of wedge **252** shown in FIG. 11 insures that the lowest order registering wheels are centered even if they should abut the edge of one of the teeth of gears **250**.

One-way overrunning clutches **32** permit free centering movement of registering wheel assemblies **130** and **132** in the direction of input which is counterclockwise in FIG. 10 and clockwise in the direction of FIG. 13. Centering movement through a partial revolution in the reverse direction is permitted by resilient connection **146** shown in FIG. 12A in which coil spring **150** can absorb considerable backward movement.

After lowest order registering wheels **130***a* and **132***a* have been centered, the subsequent lifting of follower lever **270** on bar **274** rotates connected bell crank **266**. This moves pin **267** in slot **269** toward the left and pulls locking slide **260** carrying hooked fingers **262** to the left into engagement with the spaces between pegs **158** about the periphery of higher order registering wheels **130***b*, *c*, *d* and **132***b*, *c* and *d* (as shown in FIG. 21). This securely locks the actuated registering wheels prior to the printing operation.

The "off" movement of starting shaft **38** also raises pin **228** in cam plate **226** to cause shafts **142** and **144** to be pulled axially outwardly to the position shown in FIG. 14 in which reset pawl **162** is in line with shouldered hole **174**. Shafts **142** and **144** are not immediately locked against shoulder **168** unless they are in the zero position because reset pawls **162** are otherwise angularly misaligned with it. Shafts **142** and **144** and wheel assemblies **130** and **132** are thus conditioned for reengaging pawls **162** with shoulders **168** when numbered wheels **130** and **132** are rotated back to zero during their resetting movement as later described.

The "off" movement of starting shaft **38** also moves transfer gear pinions **152** on yoked slide **154** to the left (as shown in FIG. 21) thereby disengaging transfer pinions **152** from printing wheel assemblies **130** and **132**. Transfer gears **152** then engage arresting springs **157** anchored to slide **154** by brackets **159** to maintain them aligned for reengagement with zeroed printing wheel assemblies **130** and **132**. Spring fingers **156** on yoked slides **154** engage into the spaces between gear pegs **158** on numbered wheel assemblies **130** and **132** to retard their movement and prevent them from dragging together during the resetting operation before their pawls **162** engage shoulders **168**.

Printing

The printing operation is then automatically accomplished when drawer **14** is pulled outwardly from the inserted position shown in FIGS. 5 and 6 to the withdrawn position shown in FIGS. 1, 2, 7 and 8. In the inserted position of FIGS. 5 and 6, printing roller **50** has been forced down into contact with the outer edge of ticket **60** in preparation for printing. The outward movement of drawer **14** causes gear train **31** shown in FIG. 1 to rotate printing roller **50** across ticket **60** and credit card **58** without any relative movement between surfaces. This firmly presses roller **50** against ticket **60** which is in turn forced (without buckling) against the raised indicia on credit card **58** and total gallons and cost printing wheels **130** and **132**—as well as against the date and unit cost printing wheels under blocks **66** and **68** shown in FIGS. 6 and 8. Roller **50** is inked. It therefore prints the aforementioned information upon the surface of ticket **60** as well as within the multiple carboned leaves of ticket **60**. During the outward movement of drawer **14**, full-stroke pawl **23** prevents its motion from being reversed until it is all the way out.

When drawer **14** is pulled almost all of the way out, hooks **108** (shown in FIGS. 5–8) engage front surfaces **101** of ticket-sensing feelers **98**. This pulls out bars **82** to which hooks **108** are attached and also sliding cam assembly **80** to release printing roller bracket **70**. Roller **50** is then raised upwardly by compression springs **74** reacting against pins **78**. Hooks **108** also maintain ticket-sensing levers **98** retracted away from ticket-receiving area **100** of platen **52** to facilitate removal of ticket **60** and its replacement. During this printing operation, printing wheels **130** and **132** are maintained firmly fixed by the aforementioned engagement of locking wedge assemblies **248** and hooked locking fingers **262**.

Resetting

Drawer **14** must be reinserted into receptacle **18** in casing **22** before dispenser computer **16** and printing mechanism **128** can be reset to zero. Resetting knob **112** thus cannot be moved unless recess **114** in the bottom of drawer **14** is aligned with end **116** of interlocking lever **118**. If drawer **14** is inserted into the dispenser without a ticket **60**, ticket-sensing levers **98** can rotate within ticket receiving area **100** thereby removing their projecting ends **97** from the path of contact with inner projections **96** on sliding bars **82**. This prevents printing roller **50** from being pressed into contact with a bare platen **52** to avoid unnecessary wear on the roller and smearing of platen **52**. However, even without ticket **60** in place, the full sequence of operation of registering mechanism **128** is accomplished.

Movement of dispenser resetting knob **112** rotates printer resetting shaft **40** from the position shown in FIGS. 16, 18 and 20 to that shown in FIG. 22. Hooked lever **216** forces resetting motor latching lever **208** and latching bar **210** clockwise to release projecting edge **212** of resetting gear segment **192** from bar **210**. This allows resetting spring **196** to rotate resetting gear segment **192** rapidly in the clockwise direction. This rotates spur gears **194** and shafts **142** and **144** counterclockwise as shown in FIG. 22. Resetting pawls **162** move through inclined surfaces **172** in the hubs **170** of wheel assemblies **130** and **132** into contact with shoulders **168**. This causes shafts **142** and **144** to pick up and rotate wheel assemblies **130** and **132** back to zero (as shown in FIG. 11) because resetting gear segment **192**, shafts **142** and **144**,

pawls **162** and shoulders **168** are accordingly oriented. Numbered wheel assemblies **130** and **132** have previously been free of entering and locking wedges and transfer pinion gears to permit their resetting movement back to zero.

Flywheel assembly **206** is driven during the resetting movement of shafts **142** and **144** through gear train **204**. This retards their movement sufficiently to insure that pawls **162** dependably pick up shoulders **168** in registering wheel assemblies **130** and **132**. Spring fingers **156** on transfer pinion gear yoked slide **154** engage lightly inbetween pegs **158** in the peripheries of registering wheel assemblies **130** and **132** during resetting to prevent them from being dragged together during the first part of their resetting cycle and overriding zero before each of their reset pawls **162** engage shoulders **168**.

What is claimed is:

1. A device for printing tickets to record the operation of dispensing apparatus having metering means and a casing comprising a carriage, printable registering means in said carriage, ticket-supporting means upon said carriage for holding tickets in printing relationship with said printable registering means, a receptacle in said casing having an opening for receiving said carriage, movable means mounting said carriage upon said casing for movement of said carriage and said tickets within and outside of said receptacle, motion-permitting coupling means connecting said printable registering means with said metering means for transmitting amounts dispensed to said registering means, printing means in said casing disposed adjacent said ticket-supporting means when said carriage is within said receptacle, and actuating means connected to said printing means whereby said amounts upon said registering means are caused to be printed upon said ticket within said receptacle when said dispensing operation is completed.

2. A device as set forth in claim **1** wherein said movable means comprises slide means and said carriage is mounted upon said slide means to move within and outside of said casing.

3. A device as set forth in claim **2** wherein said ticket-supporting means comprises a platen, said platen including an opening through which said printable registering means extend whereby said ticket is caused to be printed with said amounts upon said registering means by being impressed by said printing means upon said registering means through said opening.

4. A device as set forth in claim **2** wherein said printing means comprises a printing roller and bracket means mounting said roller adjacent the path of movement of said ticket-supporting means for imprinting said tickets in conjunction with said printable registering means as said carriage is sliding outside of said casing.

5. A device as set forth in claim **4** wherein said bracket means is constructed and arranged to permit movement of said printing roller toward and away from said ticket-supporting means, and said actuating means comprises motion-transmitting means between said carriage and said bracket means whereby said printing roller is moved into contact with said ticket-supporting means when said carriage slides out of said casing whereby said ticket is printed while said carrier is being moved out of said casing.

6. A device as set forth in claim **1** wherein said dispenser includes an operating control, printing cycle operating control means in said carriage and separable coupling means connecting said dispenser control with said printing cycle control when said carriage is moved within said casing for actuating its operation in conjunction with said dispenser.

7. A device for printing tickets to record the operation of dispensing apparatus having metering means and a casing comprising a carriage, printable registering means in said carriage, ticket-supporting means upon said carriage for holding tickets in printing relationship with said printable registering means, slide means mounting said carriage upon said casing for linear movement of said carriage and said tickets, motion-permitting coupling means connecting said printable registering means with said metering means for transmitting amounts dispensed to said registering means at one end of the path of linear movement of said carriage, printing means mounted upon said casing disposed adjacent the linear path of movement of said ticket-supporting means, actuating means connected to said printing means whereby said printing means is caused to move towards contact with said ticket-supporting means to print said amounts upon said registering means upon said ticket after said dispensing operation is completed and said carriage is moved from said one end of its linear path of movement to the other, and said carriage and said printing means being constructed and arranged to permit tickets to be removed and replaced at said other end of said path of linear movement of said carriage.

8. A device as set forth in claim **7** wherein said ticket-supporting means comprises a platen, said platen including an opening through which said printable registering means extend whereby said ticket is caused to be printed with said amounts upon said registering means by being impressed by said printing means upon said registering means through said opening.

9. A device as set forth in claim **7** wherein said printing means comprises a printing roller and bracket means mounting said roller adjacent the path of movement of said ticket-supporting means for imprinting said tickets in conjunction with said printable registering means as said carrier is sliding toward said other end.

10. A device as set forth in claim **9** wherein said bracket means is constructed and arranged to permit movement of said printing roller toward and away from said ticket-supporting means, and said actuating means comprises motion-transmitting means between said carriage and said bracket means whereby said printing roller is moved into contact with said ticket-supporting means when said carriage slides toward said other end of said linear path of movement whereby said ticket is printed while said carriage is being moved toward said other end.

11. A device as set forth in claim **7** wherein said dispenser includes an operating control, printing cycle operating control means in said carriage, separable coupling means connecting said dispenser control with said printing cycle control when said carriage is moved to said one end for actuating its operation in conjunction with said dispenser, interlocking means are connected with said printing cycle control and with said carriage for locking said carriage at said one end while said dispensing operation is being conducted.

12. A device for printing tickets to record the operation of dispensing apparatus having metering means and control means comprising a frame, a set of numbered printable registering wheels in said frame, ticket-supporting means upon said frame for holding tickets in printing relationship with said set of numbered printable registering wheels, printing means mounted adjacent said ticket-supporting means for causing said amounts upon said numbered wheels to be printed upon said ticket, a rotatable shaft mounted upon said frame, said numbered wheels being rotatably mounted upon said rotatable shaft for rotation relative to said shaft, coupling means connecting said numbered wheels with said metering means for transmitting amounts dispensed from said metering means to said numbered wheels, a resetting means mounted upon said frame, motion-transmitting means connecting said resetting means to said rotatable shaft, disengageable projection means for connecting said numbered wheels to said shaft to rotate them together with said shaft, centering and locking wedge means, movable supporting means mounting said centering and locking wedge means upon said frame for engagement and disengagement with said numbered wheels, programming means

upon said frame connected with said centering and locking wedge means for centering and locking said numbered wheels after said amounts dispensed are transmitted to said numbered wheels and while said ticket is printed therewith, actuating means for said projection means, printing assembly control means on said frame connected to said actuating means whereby said numbered wheels are disconnected from said shaft when said dispenser control is turned on and said amounts are transmitted thereto from said metering means and whereby said numbered wheels are connected for rotation with said shaft when said dispenser control is turned off, said printing assembly control means being connected to operate said programming means whereby said centering and locking wedge means is disengaged from said numbered wheels when said dispenser control is turned on, said programming means engaging said centering and locking wedge means with said numbered wheels when said dispenser control is turned off to center and lock them while said ticket is printed, said printing assembly control being connected to said resetting means for operating it to reset said numbered wheels to zero after said amounts on said numbered wheels are printed, and said programming means disengaging said centering and locking wedge means from said numbered wheels while said numbered wheels are being reset to zero.

13. A device as set forth in claim **12** wherein transfer pinion means are mounted upon said frame for cooperative engagement with said numbered wheels, said transfer pinion means being mounted upon pinion support means for engaging said transfer pinion means with said numbered wheels at one end of its movement and for disengagement of said transfer pinion means from said numbered wheels at the other end of its movement, and said pinion support means being connected to said printing assembly control means to move said pinion support means to engage said transfer pinion means with said numbered wheels when said dispenser control is turned on and to disengage them when said dispenser control is turned off.

14. A device as set forth in claim **13** wherein said movable supporting means mounting said centering and locking wedge means upon said frame and said pinion support means mounting said transfer pinion means upon said frame each comprise slide means.

15. A device as set forth in claim **12** wherein said printing assembly control means is constructed and arranged to condition said programming means for operation when said dispenser control is turned on.

16. A device as set forth in claim **15** wherein said dispenser control includes a starting shaft and a resetting shaft, said printing assembly control means including a control linkage from said starting shaft to said shaft projection means whereby said numbered wheels are rotationally disconnected from said shaft when said dispenser control is turned on to permit said numbered wheels to be rotated in accordance with said amounts dispensed, said control linkage including a motion-transmitting connection from said starting shaft to said programming means whereby said programming means is conditioned for operation through its cycle when said starting shaft is turned on, said control linkage being constructed and arranged to cause movement of said starting shaft to its off position to engage said centering and said locking wedge means with said numbered wheels, and said control linkage being connected to said resetting means and to said resetting shaft for causing said resetting means to operate in response to movement of said resetting shaft.

17. A device as set forth in claim **16** wherein said resetting means comprises a spring-powered motor, a latching means in said motor for holding it cocked when said motor spring is wound, and said control linkage being connected to said motor for winding it in response to movement of said starting shaft to said on position.

18. A device as set forth in claim **17** wherein said control linkage includes a motion-permitting coupling in said connection to said resetting motor for causing said starting shaft to retract said projection means from said numbered wheels on said shaft before said resetting motor is wound.

19. A device as set forth in claim **17** wherein transfer pinion means are operatively associated with said numbered wheels, said transfer pinion means being mounted upon pinion support means for engagement and disengagement with said numbered wheels, and said control linkage means being constructed and arranged to move said transfer pinion means into engagement with said numbered wheels when said starting shaft is moved to said on position and to disengage them when said dispenser shaft is moved to said off position.

20. A device as set forth in claim **12** wherein said programming means comprises a cycling cam means, cam follower means being operatively engaged with said cycling cam means, said cam follower means being connected to said movable support means for said centering and locking wedge means, said control linking means connecting said dispenser control means to said cycling cam means to condition it for operation when said dispenser control means is turned to the on position, said control linking means connecting said dispenser control means to move said cycling cam means to engage said centering and locking means when said dispenser control means is turned to the off position, and said control linking means connecting said dispenser control means to move said cycling cam means to disengage said centering and locking wedge means from said numbered wheels when said resetting shaft is operated whereby said cycle of operation of said cycling cam means is completed.

21. A device as set forth in claim **20** wherein said cycling cam means includes a bar cage rotatably mounted about an axis of rotation, and said follower means comprises levers operatively contacting the bars of said bar cage.

22. A device as set forth in claim **21** wherein said movable support means for said centering and said locking wedge means and said pinion support means comprise slide means, said control linking means comprising a motion-transmitting link from said dispenser control means to said pinion support slide means for operating it, said lever means comprising follower lever means from said slide means supporting said centering and locking wedge means, and said follower lever means contacting said cycling cam means whereby said centering and locking wedge means are caused to engage and disengage said numbered wheels in proper sequence.

23. A device as set forth in claim **20** wherein said numbered wheels include lowest order and higher order numbered wheels, a pair of said centering and locking wedge means, one of said centering and locking wedge means engaging said lowest order numbered wheel and the other of said centering and locking wedge means engaging said higher order numbered wheels, each of said centering and locking wedge means being separately mounted upon a movable slide, a separate lever means being connected to each of said slides for engagement with cycling cam means, and said separate lever means being arranged to cause said lowest order centering and locking means to be engaged with said lowest order numbered wheels slightly before said higher order centering and locking means are engaged with said higher numbered wheels whereby said lowest order numbered wheels are first centered and then all of said numbered wheels are locked.

24. A device as set forth in claim **12** wherein said centering and said locking wedge means comprise a pair of centering and locking wedge means, said numbered wheels having projections disposed about their peripheries at a pitch distance from each other, said centering and locking wedge means being displaced from each other one-half said pitch distance, and said pair of wedge

means being movably mounted with respect to each other to cause one of said pair of wedge means to engage in a centering movement with a numbered wheel if the other of said locking wedge means should abut in non-centering relationship with said numbered wheel.

25. A device as set forth in claim **24** wherein said pair of wedge means are resiliently mounted.

26. A device as set forth in claim **12** wherein said coupling means comprises a one-way overrunning clutch means and a resilient connection whereby centering movement of said numbered wheels in both directions is permitted.

27. A device as set forth in claim **12** wherein said numbered wheels include smooth circular and shouldered hubs whereby said disengageable projection means are respectively free and connected for forward rotation with shaft.

28. A device for printing tickets to record the operation of dispensing apparatus having metering means and control means comprising a frame, a pair of rotatable shafts mounted on said frame, a set of numbered printable registering wheels rotatably mounted upon said shafts, a ticket-supporting platen upon said frame for holding tickets in printing relationship with said set of numbered printable registering wheels, said platen including an opening through which said numbered wheels extend, printing means mounted adjacent said opening for causing said amounts upon said numbered wheels to be printed upon said ticket, coupling means on the side of said frame disposed adjacent said metering means for connecting said numbered wheels with said metering means for transmitting amounts dispensed to said numbered wheels, a resetting means, motion-transmitting means connecting said resetting means to said rotatable shafts, disengageable projection means for connecting said numbered wheels to said shaft to rotate together with said shaft, centering and locking wedge means in said frame, movable supporting means mounting said centering and locking wedge means in said frame for movement radially to said shafts whereby said centering and locking wedge means are engaged and disengaged with said numbered wheels, programming cam means upon said frame connected with said centering and locking wedge means for centering and locking said numbered wheels after said amounts dispensed are transmitted to said numbered wheels and while said ticket is printed therewith, actuating means for said disengageable projection means, printing assembly control means connected to said actuating means whereby said numbered wheels are disconnected from said shaft when said dispenser control is turned on and said amounts are transmitted thereto from said metering means and whereby said numbered wheels are connected for rotation with said shaft means when said dispenser control is turned off, said printing assembly control means being connected to rotate said programming cam means whereby said centering and locking wedge means is disengaged from said numbered wheels when said dispenser control is turned on and said centering and locking wedge means are engaged with said numbered wheels when said dispenser control is turned off, said printing assembly control being connected to said resetting means for operating it to reset said numbered wheels to zero after said amounts on said numbered wheels are printed, and said printing assembly control means being connected to rotate said programming cam means to disengage said centering and locking wedge means from said numbered wheels while they are being reset to zero.

29. A device as set forth in claim **28** wherein said metering means includes a quantity shaft, said coupling means comprises a one-way overrunning clutch connecting said quantity shaft with said numbered wheels, and said coupling means being resilient to permit backward centering movement of said numbered wheels.

30. A device as set forth in claim **27** wherein said dispenser control includes a starting shaft and a resetting shaft, said printing assembly control means including a starting control shaft rotatably mounted in said frame, and said starting control shaft being operatively connected to operate said disengageable projection means, said centering and locking wedge means and said programming cam means.

31. A device as set forth in claim **30** wherein said disengageable projection means comprise pawls resiliently mounted in slots in said shafts and a pair of hub surfaces in said printing wheels, said pair of hub surfaces including a smooth circular surface and a shouldered surface, said shafts being loosely mounted to slide back and forth within said hubs, said pawls engaging said shouldered surface and freely moving relative to smooth circular surface in accordance with the axial position of said shafts, and said starting control shaft actuating said axial movement of said shaft through rack and pinion means and the sliding movement of said transfer pinion slide means by slotted lever means.

32. A device as set forth in claim **28** wherein said programming cam means comprise bar cage means rotatably mounted about said starting control shaft.

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