Sept. 12, 1967 W. D. BOUDOT ETAL 3,341,075

AUTOMATIC DISPENSING NOZZLES

Filed Oct. 23, 1965 4 Sheets-Sheet 1

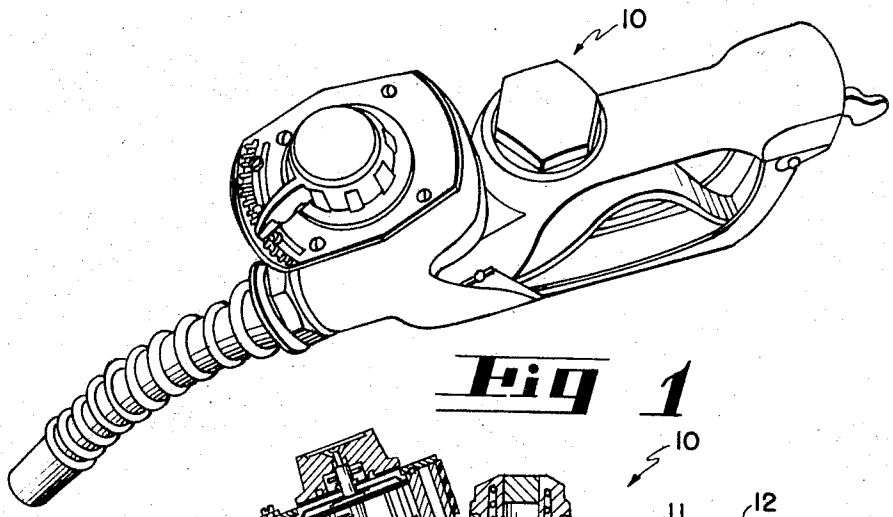

Fig 1

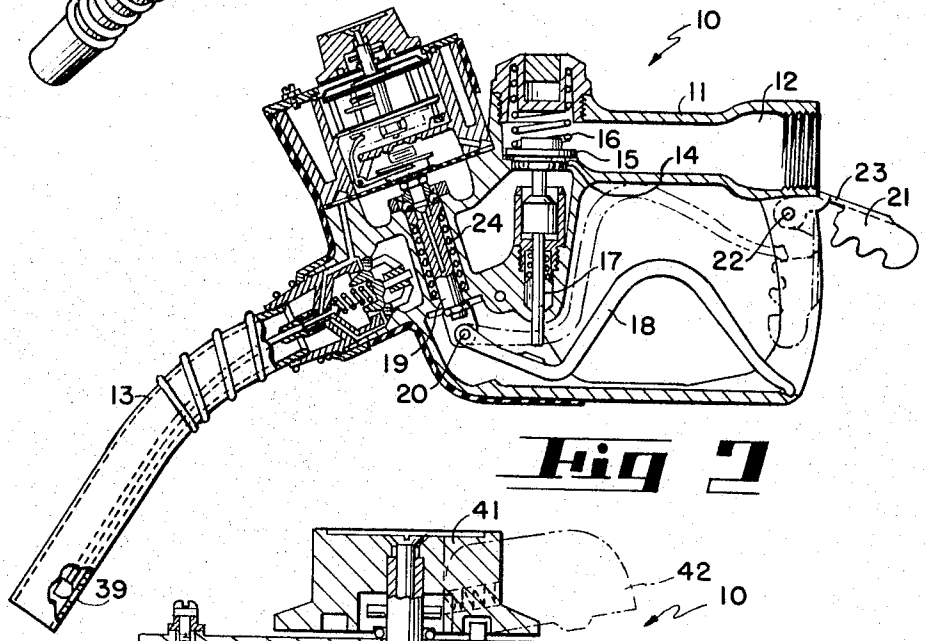

Fig 2

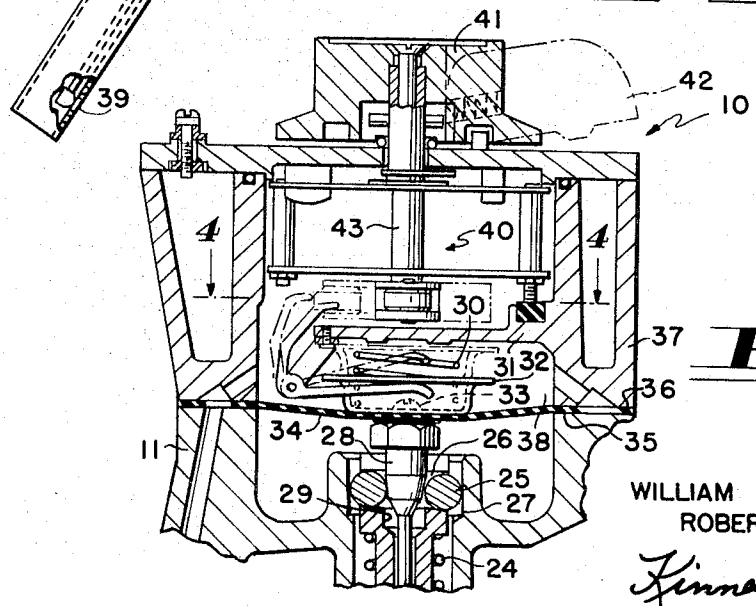

Fig 3

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AUTOMATIC DISPENSING NOZZLES

Filed Oct. 23, 1965 4 Sheets-Sheet 3

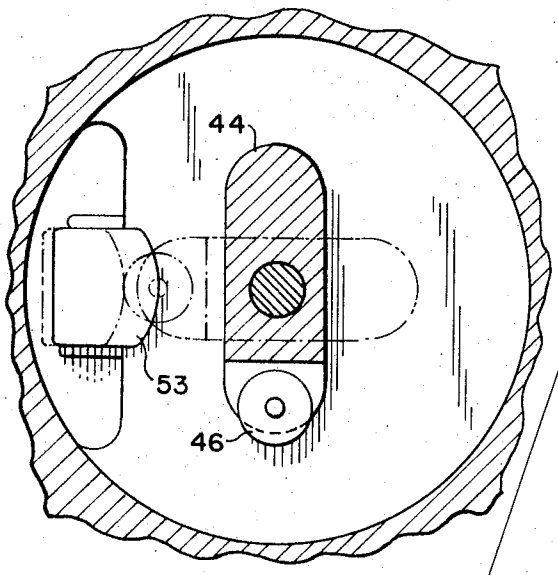

Fig 4

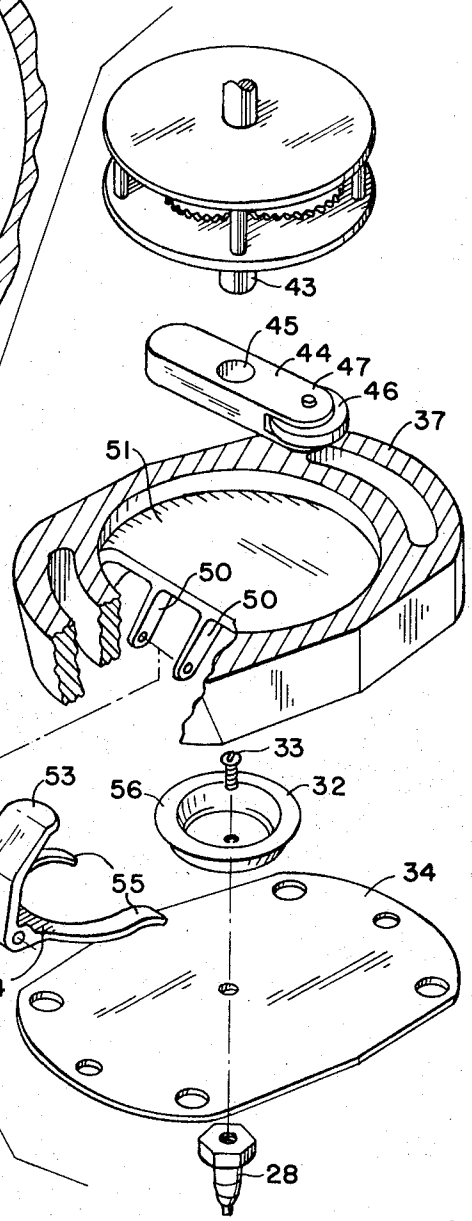

Fig 3

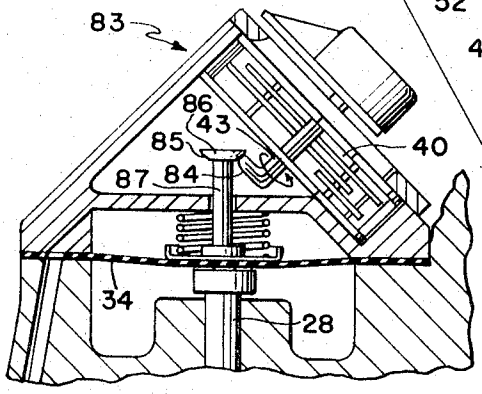

Fig 9

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AUTOMATIC DISPENSING NOZZLES

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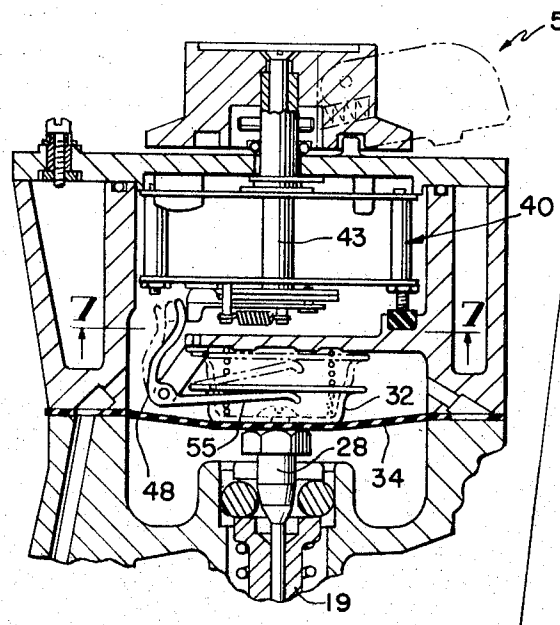


Fig 6

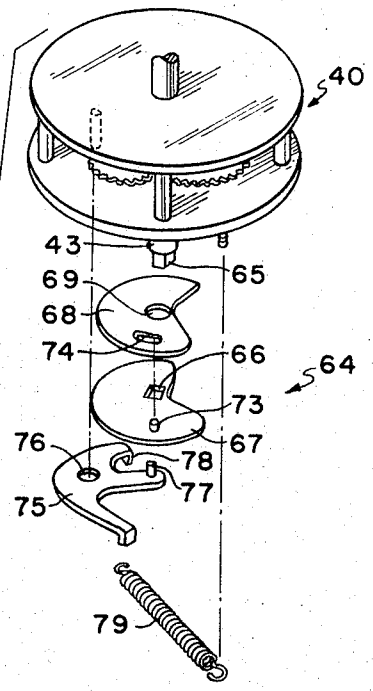
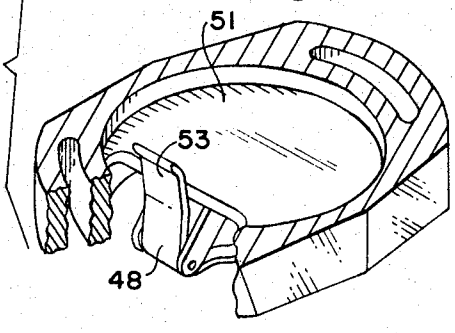


Fig 8



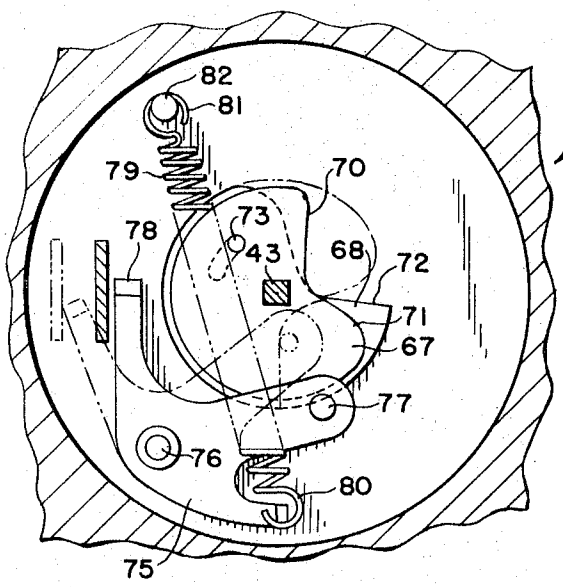


Fig 7

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AUTOMATIC DISPENSING NOZZLES

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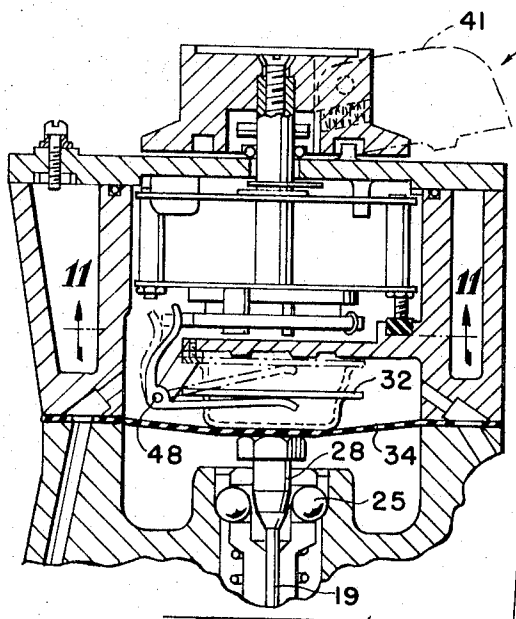


Fig 10

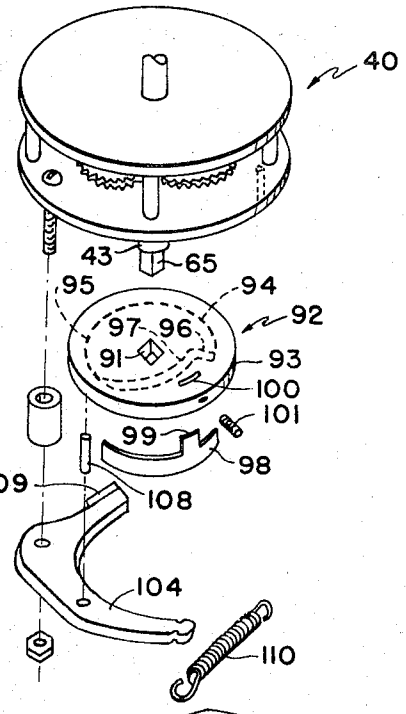
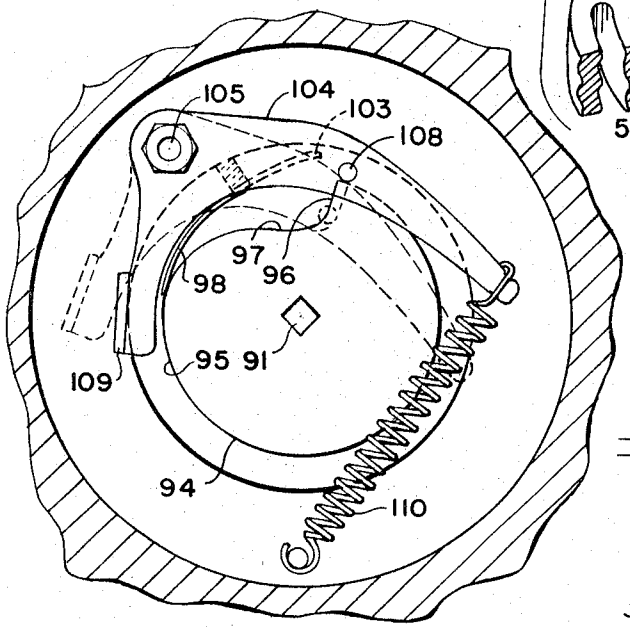


Fig 12



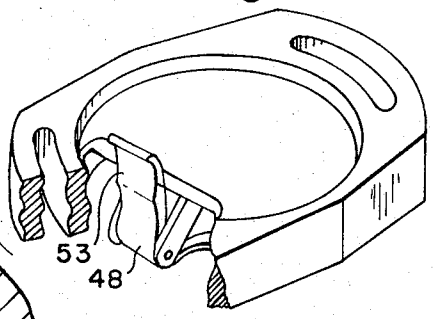


Fig 11

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3,341,075

AUTOMATIC DISPENSING NOZZLES

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Filed Oct. 23, 1965, Ser. No. 503,373
17 Claims. (Cl. 222—70)

ABSTRACT OF THE DISCLOSURE

The operating lever of the automatic shutoff dispensing nozzle is pivotally carried on the end of a spring actuated axially reciprocable plunger which is locked in position by a latching member which is moved axially of said plunger into latching and unlatching position. The latching member is carried by and moved by a diaphragm which is actuated either by air pressure or by mechanical means controlled by a timer means. The mechanical means includes a lever wherein one arm actuates the diaphragm and the other arm is actuated through a cam follower and cam driven by said timing means.

This invention relates to an improved automatic shutoff dispensing nozzle for gasoline pumps or the like as well as to improved parts from such a dispensing nozzle or the like.

It is well known that automatic shutoff dispensing nozzles for gasoline pumps or the like have been provided wherein the manual lever of the nozzle for causing fluid flow therethrough can be locked in its open position with the nozzle inserted into the vehicle tank filler pipe whereby fuel will flow through the nozzle until a sensing means of the nozzle determines that the filler pipe has been filled to the desired level and automatically causes the lever to return to its nozzle shutoff position.

However, it has been found that a large number of gasoline sales at filling stations and the like are made in dollar increments of gasoline whereby the operator must actuate the dispensing nozzle in a manual manner so that the customer will only receive the selected dollar amount of gasoline. Thus, it can be seen that the gasoline pump attendant is not free to render additional service to the customer when the customer desires a monetary increment amount of gasoline or the like.

According to the teachings of this invention, however, timer means is incorporated into the aforementioned automatic shutoff dispensing nozzle in such a manner that the gasoline pump attendant can set the timer so that a predetermined amount of gasoline will flow therethrough during a selected period of time so that when the selected period of time has lapsed, the dispensing nozzle will be automatically closed regardless of whether the gasoline fuel tank has been filled or not. In this manner, the gasoline pump attendant can supply a desired amount of gasoline in an automatic manner so as to be free to render other services to the particular customer.

For example, the timer means of this invention can be so constructed and arranged that the gasoline pump attendant can move a timer pointer to a predetermined position, as determined by the monetary increment of gasoline requested by the customer, so that the nozzle can be utilized in an automatic manner to provide an amount of gasoline approximately 5¢ or 10¢ below the requested amount whereby the attendant can subsequently manually dispense the remaining 5¢ or 10¢ of gasoline after the nozzle has been automatically shut off.

Accordingly, it is an object of this invention to provide an improved automatic shutoff dispensing nozzle having

one or more of the novel features set forth above or hereinafter shown or described.

Another object of this invention is to provide improved parts for such a dispensing nozzle or the like.

Other objects, uses and advantages of this invention are aparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a top perspective view of the improved automatic shutoff dispensing nozzle of this invention.

FIGURE 2 is a partial cross-sectional view of the dispensing nozzle illustrated in FIGURE 1.

FIGURE 3 is an enlarged, fragmentary cross-sectional view of part of the mechanism illustrated in FIGURE 2.

FIGURE 4 is an enlarged, fragmentary, cross-sectional view taken on line 4—4 of FIGURE 3.

FIGURE 5 is an exploded perspective view of the various operating parts of the device illustrated in FIGURE 3.

FIGURE 6 is a view similar to FIGURE 3 and illustrates another embodiment of this invention.

FIGURE 7 is an enlarged, fragmentary, cross-sectional view taken on line 7—7 of FIGURE 6.

FIGURE 8 is an exploded perspective view illustrating the various parts of the mechanism illustrated in FIGURE 6.

FIGURE 9 is a view similar to FIGURE 3 and illustrates another embodiment of this invention.

FIGURE 10 is a view similar to FIGURE 3 and illustrates another embodiment of this invention.

FIGURE 11 is an enlarged, fragmentary, cross-sectional view taken on line 11—11 of FIGURE 10.

FIGURE 12 is an exploded perspective view illustrating the various parts of the mechanism illustrated in FIGURE 10.

While the various features of this invention are hereinafter described and illustrated as being particularly adaptable for gasoline pump dispensing nozzles, it is to be understood that the various features of this invention can be utilized singly or in any combination thereof to provide dispensing means for other devices as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURES 1–3, an improved automatic dispensing nozzle of this invention is generally indicated by the reference numeral **10** and includes a housing means **11** having an inlet **12** adapted to be interconnected to a fuel pump or the like and having an outlet spout **13** interconnected to the inlet **12** by a valve seat **14**, the valve seat **14** being opened and closed by a valve member **15** normally urged to the closed position by a compression spring **16**.

The valve member **15** carries a stem **17** engageable by a manually operated lever **18** pivoted to a movable plunger **19** by pivot means **20**. Since the plunger **19** is normally locked in the position illustrated in FIGURE 2, in a manner hereinafter described, the lever **18** is adapted to be manually moved from the full line position illustrated in FIGURE 2 to the dotted line position illustrated in FIGURE 2 to raise the stem **17** upwardly in opposition to the force of the compression spring **16** whereby the valve member **15** is moved to an open position.

In order to latch the lever **18** in its fully open position, a latch member **21** is pivotally mounted to the housing **11** by a pivot pin **22**, the latch member **21** normally being urged to the full line position by a leaf spring **23** in a conventional manner. However, when the lever **18** is moved to the dotted line position illustrated in FIGURE 2, and the latch member **21** is moved in a clockwise di-

rection to its dotted line position, it can be seen that the latch member **21** will hold the lever **18** in its valve opening position until the lever **18** is automatically or manually released from the latch member **21** in the manner hereinafter described.

The axially movable plunger **19** is normally urged to the position illustrated in FIGURES 2 and 3 by a light compression spring **24**, the plunger **19** carying a plurality of metal balls **25** disposed in slots **26** therein and normally forced outwardly into locking engagement with shoulder means **27** of the housing **11** by a latch member **28** receivable in a bore **29** of the plunger **19**.

The latch member **28** is normally urged to the position illustrated in FIGURE 3 to latch the plunger **19** in the illustrated position thereof by a compression spring **30** disposed against a housing portion **31** and a cup-shaped retainer **32** operatively interconnected to the latch member **28** by a threaded fastening member **33**, a flexible diaphragm **34** being disposed between the cup-shaped retainer **32** and the latch member **28** and having its outer periphery sealed between a surface **35** of the housing **11** and a surface **36** of another housing **37** for a purpose hereinafter described.

The housing **37** defines a chamber **38** with the diaphragm **34**. The chamber **38** is adapted to be evacuated when fuel is flowing through the open member **15** and reaches a level in the vehicle filler pipe to cover the open end of a conduit **39** disposed in the spout **13** whereby the diaphragm **34** is moved upwardly by air pressure and carries the latching member **28** therewith so that the balls **25** can move radially inwardly and clear the shoulders **27**. When the balls **25** move radially inwardly and clear the shoulders **27**, the force of the compression spring **16** forces the lever **18** downwardly, as the plunger **19** is adapted to move downwardly, whereby the lever **18** kicks free of the latch member **21** and is adapted to move to its closed position as illustrated in full lines in FIGURE 2 whereby the valve member **15** automatically closes against the valve seat **14** to terminate the flow of fuel through the nozzle **10**.

Such automatic closing of the valve member **15** when the fuel level in the vehicle tank filler pipe has reached the level of the end of the conduit **39** is fully disclosed in the patents to Briede, No. 3,085,600, issued Apr. 16, 1963, and Duerr, No. 2,582,195, issued Jan. 8, 1952.

However, according to the teachings of this invention, improved means are provided for automatically raising the diaphragm **34** to unlatch the member **28** when a predetermined period of time has lapsed to automatically control the flow of fuel through the nozzle **10** in relation to time, in addition to the automatic shutoff means thereof previously described and set forth in the aforementioned U.S. patent.

In particular, it can be seen that the housing **37** includes a manually wind timer means **40** having a control knob **41** provided with a pointer **42**. When the knob **41** is rotated a desired distance in a timer wind up direction, the timer means **40** automatically runs for a period of time, dependent upon the position of the pointer **42**, so that when the period of time has lapsed, the timer means **40** of this invention will automatically raise the diaphragm **34** to unlatch the plunger **19** and permit the lever **18** to move from its latched on position illustrated in dotted lines in FIGURE 2 to its unlatched position illustrated in full lines in FIGURE 2 so that only a predetermined amount of fuel will flow through the nozzle **10**.

While the timer means **40** can comprise any suitable timer means, one such timing means is a commercial type spring wound timer movement.

The timer motor **40** includes an operating shaft **43** which will be rotated by the timer motor **40** for a purpose now to be described.

An operating arm **44** has a bore **45** receiving the end of the shaft **43** whereby the arm **44** will be rotated in unison with the shaft **43**, the arm **44** rotatably carrying a cam roller **46** on the end **47** thereof for a purpose hereinafter described.

The other arm **54** of the lever **48** is bifurcated and is adapted to have the ends **55** thereof received under an outwardly directed flange **56** of the cup-shaped retainer **32** in the manner illustrated in FIGURE 3.

The operation of the dispensing nozzle **10** of this invention will now be described.

Assuming that the gasoline station attendant desires to utilize the dispensing nozzle **10** so as to dispense a desired monetary increment of gasoline, the attendant turns the knob **41** to an indicated position thereof for the particular monetary increment of gasoline whereby the timer motor **40** is wound up and the arm **44** is disposed in the position illustrated in full lines in FIGURE 4. In this manner, the force of the compression spring **30** holds the diaphragm **34** in its plunger latching position as illustrated in FIGURE 3. Thereafter, the operator inserts the spout into the filler pipe and locks the handle **18** in the dotted position illustrated in FIGURE 2 so that the valve member **15** will be locked in its open position whereby gasoline can flow from the inlet **12** out through the outlet spout **13** into the vehicle filler pipe. As the gasoline flows through the nozzle **10**, the timer motor **40** is operating to continuously move the arm **44** in FIGURE 4 in a counter clockwise direction whereby as the selected increment of time is lapsing, the cam roller **46** comes into engagement with the end **53** of the lever **48** and gradually pivots the same from the full line position illustrated in FIGURE 3 to the dotted line position illustrated in FIGURE 3 whereby the diaphragm **34** is pulled upwardly in opposition to the force of the compression spring **30** by the pivoting lever **48**. When the diaphragm **34** has been pulled upwardly sufficiently to release the latch member **28** from the balls **25** whereby the balls **25** can move radially inwardly, the force of the compression spring **16** kicks the lever **18** downwardly to release the same from the latch member **21** so that the lever **18** can be moved to its closed position by the compression spring **16** and terminate the flow of fuel therethrough.

Therefore, it can be seen that the dispensing nozzle **10** of this invention not only permits the gasoline station attendant to completely and automatically fill the gasoline tank of the vehicle or the like in the manner set forth in the aforementioned patent, but also the dispensing nozzle **10** of this invention is adapted to dispense desired increments of gasoline based upon the position of the timer knob **41** in its wind up direction.

While the dispensing nozzle **10** of this invention has been illustrated as having a gradual movement of the lever **48** to move the diaphragm **34** from its latching position to its unlatching position, it is to be understood that the diaphragm **34** could be moved to its unlatching position by a snap action if desired.

In particular, another dispensing nozzle of this invention is generally indicated by the reference numeral **64** in FIGURES 6–8. Since the major portion of the dispensing nozzle **64** is identical to the dispensing nozzle **10**, like parts thereof will be designated by like reference numerals.

As illustrated in FIGURES 7 and 8, the timer shaft **43** of the timer motor **40** has a square shaped end **65** receivable in a complementary bore **66** of a cam disc **67** whereby the shaft **43** is fixed to the cam disc **67** but loosely receives another cam disc **68** through a bore **69** thereof, the cam disc **67** having smooth camming surfaces **70** and **71** while the cam disc **68** has a substantially straight radial camming surface **72** for a purpose hereinafter described.

The cam disc **67** carries a pin **73** receivable in a slot **74** of the cam disc **68** to provide a lost motion driving connection therebetween for a purpose hereinafter described.

A snap action lever **75** is pivotally mounted to the bottom plate of timer motor **40** by a pivot pin **76**, the snap

acting lever 75 carrying a pin 77 engageable with the cam discs 67 and 68. The lever 75 has an end or arm 78 adapted to be engageable with the arm 53 of the lever 48.

The lever 75 is normally urged to pivot about the pin 76 in a counterclockwise direction in FIGURE 7 by an extension spring 79 having one end 80 fastened to the lever 75 and the other end 81 thereof fastened to a pin 82 carried by the bottom plate of timer motor 40.

The operation of the dispensing nozzle 64 of this invention will now be described.

Assuming that the gasoline pump attendant desires to dispense a monetary increment of gasoline through the nozzle 64, the attendant rotates the knob 41 in the proper direction by rotating the shaft 43 in a counterclockwise direction in FIGURE 7 whereby the lever 48 is adapted to assume the position illustrated in full lines in FIGURE 6 so that the plunger 19 will be in its latched position.

However, as the timer shaft 43 begins to run in a clockwise direction, see FIGURE 7, the same causes the cam disc 67 to also rotate in a clockwise direction whereby a lost motion will be created between the disc 67 and the disc 68 until the pin 73 of the disc 67 picks up the disc 68 whereby the surface 72 of the disc 68 will be disposed outwardly from the camming surface 71 of the disc 67 in the manner illustrated in FIGURE 7.

With the discs 67 and 68 rotating in a clockwise direction in FIGURE 7, it can be seen that eventually the radial straight surface 72 of the disc 68 will move adjacent the pin 77 of the lever 75 whereby the extension spring 79 will pull the pin 77 radially inwardly toward the shaft 43 with a snap action whereby the arm 78 of the lever 75 will move from the full line position illustrated in FIGURE 7 to the dotted line position illustrated in FIGURE 7 with a snap action to pivot the lever 48 and raise the diaphragm 34. Raising of the diaphragm 34 unlatches the plunger 19 to permit the nozzle 64 to automatically terminate the flow of fuel therethrough in the same manner as set forth for the dispensing nozzle 10 previously described.

When it is desired to subsequently turn the timer knob 41 back to another increment of time position, the knob 41 is turned in the proper direction to cause the shaft 43 in FIGURE 7 to be turned in a counterclockwise direction. Since the disc 68 will remain stationary while the disc 67 is turned, because of the lost motion between the pin 73 and slot 74, it can be seen that the surface 71 of the cam disc 67 will be moved forwardly in front of the straight radial camming surface 72 of the disc 68 to cause the pin 77 of the lever 75 to be cammed outwardly to the position illustrated in full lines in FIGURE 7.

When it is desired to return the timer knob 41 to its off position, the knob 41 is turned in the proper direction to cause the shaft 43 to be turned in a clockwise direction in FIGURE 7. It should be noted that when the pin 77 rode inwardly along the straight radial cam surface 72 of the disc 68, it caused relative movement of the disc 68 with respect to the disc 67 due to the lost motion arrangement of the pin 73 and the slot 74. Thus, as soon as the shaft 43 begins rotation in the clockwise direction in FIGURE 7, the disc 67 initially moves while the disc 68 remains stationary until the pin 73 reaches the position in the slot 74 as shown in FIGURE 7.

When in this position, the surface 70 of the disc 67 will engage the pin 77 before surface 72' of the disc 68. Thus, the surface 70 of the disc 67 will wedge the pin 77 outwardly against the force of the spring 79 to return the pin 77 to a position wherein it rides on the cam disc 67 as shown in full lines in FIGURE 7.

Accordingly, it can be seen that the dispensing nozzle 64 of this invention is adapted to abruptly stop the flow of fuel therethrough with a snap action provided by the spring 79. Further, it can be seen that the dispensing nozzle 64 of this invention is also adapted to terminate the flow of fuel therethrough when the vehicle filler pipe has been filled to the desired level in the manner provided for the dispensing nozzle 10 previously described as well as to provide desired increments of time filling therefor.

While only one form of latching means 28 has been provided for the plunger 19, it is to be understood that the various features of this invention can be readily usable with other types of latching means.

Reference is now made to FIGURE 9 wherein another dispensing nozzle of this invention is generally indicated by the reference numeral 83 and has the parts thereof that are similar to the dispensing nozzle 10 indicated by like reference numerals.

However, the timer means 40 is disposed at an angle relative to the plane of the diaphragm 34 and has a cam 84 fixed to the end of the shaft 43 for engaging a beveled surface 85 on an end 86 of a stem 87 interconnected to the diaphragm 34.

In this manner, the timer means 40 can be set for the desired increment of time and, when the selected period of time has lapsed, the rotating shaft 43 will cause the cam 84 to raise the stem 87 and, thus, raise the diaphragm 34 so that the manual lever will be unlatched in the manner previously described.

Further movement of the shaft 43 moves the cam 84 away from the stem 87 so that the diaphragm 34 can reset the latching mechanism for further use thereof.

Thus, it can be seen that the dispensing nozzle 83 not only provides for monetary increments of fuel to flow therethrough, but also the dispensing nozzle 83 permits the same to be automatically shut off when the tank filler pipe has been filled to the desired level in the manner set forth in the United States patents to Duerr, No. 2,582,195, issued Jan. 8, 1952, and Briede, No. 3,085,600, issued Apr. 16, 1963.

Referring to FIGURES 10–12, there is shown another dispensing nozzle of this invention as generally indicated by the reference number 90. Various parts of this embodiment that are the same as parts of other modifications will be indicated by the same reference numeral.

As illustrated in FIGURES 11 and 12, the timer shaft 43 of the timer motor 40 has the square shaped end 65, which is receivable in a complementary bore 91 of a cam disc 92 whereby the shaft 43 is fixed to the cam disc 92. The cam disc 92 includes a circular portion 93 and a cam 94, which is smaller than the portion 93. The circular portion 93 is disposed closer to the bottom plate of the timer motor 40 than the cam 94.

The cam 94 has its periphery formed with a circular portion 95 of constant radius, a substantially straight radial inwardly extending portion 96, and a slow rise portion 97. The portion 96 extends from one end of the circular portion 95 towards the axis of rotation of the shaft 43. The portion 97 rises slowly from the inner end of the portion 96 until it reaches the other end of the circular portion 95.

A spring strip 98 has a projection 99 extending therefrom for positioning within a slot 100 in the circular portion 93 of the cam disc 92. A set screw 101 engages the projection 99 to attach the spring strip 98 to the circular portion 93.

As shown in FIGURE 11, the strip 98 has one end 102 in contact with the circular portion 95 of the periphery of the cam 94 at its junction with the slow rise camming portion 97. The spring strip 98 has its other end 103 spaced from the other end of the circular portion 95 of the periphery of the cam 94 adjacent its junction with the radial camming portion 96.

A snap action lever 104 is pivotally mounted to the bottom plate of the timer motor 40 by a bolt 105 and a nut 106. A spacer 107 surrounds the bolt 105 between the top of the lever 104 and the bottom plate of the timer motor 40. The snap action lever 104 carries a pin 108, which rides along the periphery of the cam 94 of the cam disc 92 to function as a cam follower. The lever 104 has an end 109 adapted to be engageable with the

arm 53 of the lever 48 when the lever 104 is in the dotted line position of FIGURE 11.

The lever 104 is continuously urged to pivot about the bolt 105 in a clockwise direction in FIGURE 11 by an extension spring 110. The extension spring 110 has one end 111 fastened to the lever 104 at the end, which is remote from the end 109. The spring 110 has its other end 112 fastened to a pin 113, which is carried by the bottom plate of the timer motor 40.

Considering the operation of the dispensing nozzle 90, it should be understood that the cam disc 92 has the pin 108 positioned on the circular portion 95 of the periphery of the cam 94 beyond the end 102 of the spring strip 98 when the timer knob 41 is in its off position. When it is desired to dispense a monetary increment of gasoline through the nozzle 90, the knob 41 is rotated in the proper direction to cause the shaft 43 to rotate in a counterclockwise direction in FIGURE 11. This rotation of the shaft 43 results in the pin 108 moving from the circular portion 95 of the periphery of the cam 94 onto the exterior surface of the spring strip 98.

As the shaft 43 and associated square shaped end 65 rotate counterclockwise in FIGURE 11, the strip 98 moves inwardly as the end 103 is approached by the pin 108 due to the force of the spring 110 urging the lever 104 clockwise about the bolt 105. Accordingly, the end 103 of the spring strip 98 moves inwardly to form a continuation of the circular portion 95 of the periphery of the cam 94 to permit the pin 108 to move onto the circular portion 95. End 103 immediately returns to the position of FIGURE 11 after pin 108 has moved onto the circular portion 95. It should be understood that the minimum rotation of the timer knob 41 must be sufficient to rotate the cam disc 92 to position the pin 108 on the circular portion 95 of the periphery of the cam 94. It is not left on the spring strip 98.

As soon as the timer knob 41 has been set and released, the timer motor 40 causes clockwise rotation of the shaft 43 in FIGURE 11. When the cam timer 92 is rotated clockwise beyond the position shown in FIGURE 11, the pin 108 rides down the radial camming portion 96 of the periphery of the cam 94 to cause the end 109 of the lever 104 to engage the arm 53 of the lever 48. As previously mentioned, this occurs with the lever 104 in the dotted line position of FIGURE 11.

The timer motor 40 continues to run until the cam disc 92 has rotated clockwise sufficiently to move the pin 108 along the slow rise portion 97 and onto the circular portion 95 of the periphery of the cam 94. The end 102 of the spring strip 98 is pushed away from its contact with the cam 94 to allow the pin 108 to exit from the portion 97 onto the portion 95. The strip 102 immediately returns to the position of FIGURE 11 after the pin 108 has moved from the portion 97 to the circular portion 95 of the periphery of the cam 94.

The engagement of the arm 53 of the lever 48 by the end 109 of the lever 104 results in a pivoting of the lever 48 with a snap action. This moves the diaphragm 34 upwardly to unlatch the plunger 19 whereby flow of fuel through the nozzle 90 is automatically terminated by the same means as set forth for the dispensing nozzle 10.

The nozzle 90 of FIGURES 10–12 allows the timer knob 41 to be set to the desired monetary increment of fuel with only one turn of the knob 41. If the spring strip 98 were not employed, it would not be possible to turn the cam disc 92 counterclockwise in FIGURE 11 because the pin 108 would rest against the portion 96 of the periphery of the cam 94 and not permit any further movement.

If the timer motor 40 of any of the nozzles 10, 64, 83, or 90 is still running when the gas tank becomes filled, flow through the nozzle is automatically stopped by the mechanism described in detail in the aforesaid United States Patent No. 3,085,600 even though the timer motor 40 is still in operation. Thus, when the tank becomes filled, the pressure on the upper side of the diaphragm 34 is less than the atmospheric pressure on the lower side of the diaphragm 34 whereby the diaphragm 34 rises. This pulls the latch member 28 upwardly whereby the balls 25 move radially inwardly to allow the plunger 19 to drop and automatically shut off flow through the nozzle.

When this happens, the cup-shaped retainer 32 also rises. However, this does not effect the operation of the lever 48. Accordingly, if the lever 48 should become wedged or locked in some position so as not to be able to pivot, the cup-shaped retainer 32 can still be moved upwardly to automatically cut off the flow when the tank is filled. A similar operation occurs with the embodiment of FIGURE 9.

Therefore, it can be seen that the various features of this invention are readily adaptable to be utilized with different latching means for the manually operated lever of dispensing nozzles or the like whereby the dispensing nozzle can have the flow of fuel therethrough controlled by increments of time selected by the gasoline pump attendant so that he can automatically dispense monetary increments of fuel to perform additional services for the customer.

Thus, it can be seen that not only does this invention provide improved automatic shutoff dispensing nozzles or the like, but also this invention provides improved parts for such dispensing nozzles or the like.

While the forms of the invention now preferred have been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, a movable plunger pivotally mounting said lever to said nozzle, latch means for holding said plunger in one position thereof, a latch member for holding said lever in said one position thereof, a timer means, a flexible diaphragm interconnected to said latch means, and mechanical means operatively interconnected to said timer means and to said diaphragm whereby said timer means moves said diaphragm in one direction to unlatch said plunger after a period of time has lapsed so that said plunger can move to another position thereof and release said lever from said latch member to move to said other position thereof and close said valve member, a cup-shaped retainer being carried by said diaphragm and said mechanical means including a pivotally mounted lever means having one end engaging said retainer.

2. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, a movable plunger pivotally mounting said lever to said nozzle, latch means for holding said plunger in one position thereof, a latch member for holding said lever in said one position thereof, a timer means, a flexible diaphragm interconnected to said latch means, and mechanical means operatively interconnected to said timer means and to said diaphragm whereby said timer means moves said diaphragm in one direction to unlatch said plunger after a period of time has lapsed so that said plunger can move to another position thereof and release said lever from said latch member to move to said other position thereof and close said valve member, a cup-shaped retainer being carried by said diaphragm and said mechanical means including a pivotally mounted lever means having one end engag-

ing said retainer, and said timer means including cam means for camming said lever means.

3. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, a movable plunger pivotally mounting said lever to said nozzle, latch means for holding said plunger in one position thereof, a latch member for holding said lever in said one position thereof, a timer means, a flexible diaphragm interconnected to said latch means, and mechanical means operatively interconnected to said timer means and to said diaphragm whereby said timer means moves said diaphragm in one direction to unlatch said plunger after a period of time has lapsed so that said plunger can move to another position thereof and release said lever from said latch member to move to said other position thereof and close said valve member, a cup-shaped retainer being carried by said diaphragm and said mechanical means including a pivotally mounted lever means having one end engaging said retainer, a spring means being received in said retainer and tending to prevent movement of said diaphragm in said one direction.

4. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, a movable plunger pivotally mounting said lever to said nozzle, latch means for holding said plunger in one position thereof, a latch member for holding said lever in said one position thereof, a timer means, and mechanical means operatively interconnected to said timer means and to said latch means whereby said timer means unlatches said plunger after a period of time has elapsed so that said plunger can move to another position thereof and release said lever from said latch member to move to said other position thereof and close said valve member, said mechanical means including a pivotally mounted lever means, said timer means including cam means engaging said lever means to pivot said lever in one direction when said period of time lapses so that said latch means is unlatched from said plunger, said cam means including a cam, a pivotally mounted member having a cam follower cooperating with the periphery of said cam, and means to constantly urge said pivotally mounted member into contact with the periphery of said cam; said cam having a part of its periphery shaped to cause movement of said cam follower so as to result in pivotal movement of said pivotally mounted member in a direction to engage said lever means when said cam rotates in one direction; and means to prevent said cam follower from engaging said part of the periphery of said cam when said cam rotates in the opposite direction.

5. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, a movable plunger pivotally mounting said lever to said nozzle, latch means for holding said plunger in one position thereof, a latch member for holding said lever in said one position thereof, a timer means, and mechanical means operatively interconnected to said timer means and to said latch means whereby said timer means unlatches said plunger after a period of time has lapsed so that said plunger can move to another position thereof and release said lever from said latch member to move to said other position thereof and close said valve member, said mechanical means including a pivotally mounted lever means, said timer means including cam means engaging said lever means to pivot said lever in one direction when said period of time lapses so that said latch means is unlatched from said plunger, said cam means including a cam having a periphery with a circular portion of constant radius, a radial inwardly extending portion extending from one end of said circular portion, and a slow rise portion extending from the inner end of said radial inwardly extending portion to the other end of said circular portion; and resiliently biased means disposed across said radial portion and said slow rise portion of the periphery of said cam, said resiliently biased means allowing a cam follower to follow said radial inwardly extending portion and said slow rise portion when said cam and the cam follower move relative to each other in one direction of rotation and preventing the cam follower from following said radial inwardly extending portion and said slow rise portion when said cam and the cam follower move relative to each other in the opposite direction of rotation.

6. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, a movable plunger pivotally mounting said lever to said nozzle, latch means for holding said plunger in one position thereof, a latch member for holding said lever in said one position thereof, a timer means, and mechanical means operatively interconnected to said timer means and to said latch means whereby said timer means unlatches said plunger after a period of time has lapsed to that said plunger can move to another position thereof and release said lever from said latch member to move to said other position thereof and close said valve member, said mechanical means including a pivotally mounted lever means, said timer means including cam means engaging said lever means to pivot said lever in one direction when said period of time lapses so that said latch means is unlatched from said plunger, said cam having its periphery formed with a first portion of constant radius, a second portion extending radially inwardly from one end of said first portion, and a third portion of slow rise extending from the inner end of said second portion to the other end of said first portion; and a spring strip disposed adjacent said second and third portions of the periphery of said cam, said strip having one end forming a continuation of said other end of said first portion and its other end spaced from said one end of said first portion when said spring strip is in its rest position, said spring strip allowing a cam follower to move from said other end of said first portion to said one end of said first portion without contacting said second portion or said third portion by riding on said spring strip but allowing the cam follower to follow said second portion and said third portion when moving from said one end of said first portion to said other end of said first portion.

7. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in open position opening said valve member and when in another position closing said valve member, an axially movable plunger pivotally mounting said lever to said nozzle, latch member for holding said plunger in one position thereof, a latch for holding said lever in said one position thereof, a timer means and mechanical means operatively interconnected to said timer means and to said latch member said timer means moving said latch member in a direction axially away from said plunger to unlatch said plunger after a period of time has lapsed so that said plunger can move to another position thereof and release said lever from said latch to move to said other position thereof and close said valve member, said mechanical means including a pivotally mounted lever means, one arm of which lever directly operates said latch member, and said timer means including cam means engaging said lever means and pivoting said lever arm in

said direction when said period of time lapses so that said latch member is moved therewith and unlatched from said plunger.

8. An automatic shutoff dispensing nozzle as set forth in claim 7 wherein said cam means includes a roller mounted on an end of an arm that is rotated by said timer means.

9. An automatic shutoff dispensing nozzle as set forth in claim 7 wherein said cam means includes a snap-acting member for pivoting said lever means to its unlatching position with a snap action.

10. An automatic shutoff dispensing nozzle as set forth in claim 9 wherein said cam means includes a pair of relatively movable cam plates rotatably driven by said timer means.

11. An automatic shutoff dispensing nozzle as set forth in claim 9 wherein said cam means includes a cam having a periphery for cooperating with said snap-acting member to move said snap-acting member from its inactive position to its unlatching position when said cam rotates in one direction, said cam having its periphery formed to return said snap-acting member to its inactive position during continued rotation of said cam in said one direction, and means to maintain said snap-acting member in its inactive position when said cam rotates in the opposite direction.

12. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted lever when in one position opening said valve member and when in another position closing said valve member, an axially movable plunger pivotally mounting said lever to said nozzle, latch member for holding said plunger in one position thereof, a latch for holding said lever in said one position thereof, a timer means, a flexible diaphragm interconnected directly to said latch member, and mechanical means operatively interconnected to said timer means and to said diaphragm, said timer means through said mechanical means, moving said diaphragm and said latch member in a direction axially away from said plunger to unlatch said plunger after a period of time has lapsed so that said plunger can move to another position thereof and release said lever from said latch to move to said other position thereof and close said valve member.

13. An automatic shutoff dispensing nozzle as set forth in claim 12 wherein said nozzle has means to create a vacuum on one side of said diaphragm to move said diaphragm in said one direction independently of said timer means.

14. An automatic shutoff dispensing nozzle as set forth in claim 12 wherein a spring means tends to resist movement of said diaphragm in said one direction.

15. An automatic shutoff dispensing nozzle as set forth in claim 12 wherein said mechanical means includes a cam member and a stem on said diaphragm, said cam being rotated by said timer means about an axis disposed angularly to the axis of said stem.

16. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat; a valve member for opening and closing said valve seat; means to move said valve member from its closed position to its open position and vice versa; means to releasably retain said valve member moving means in a position where said valve member is in its open position; timer means to actuate said releasably retaining means to cause said valve member moving means to move said valve member to its closed position; said timer means including a cam, a pivotally mounted member having a cam follower cooperating with said cam, and means to rotate said cam in one direction to select the length of time before said timer means actuates said releasably retaining means; said timer means causing rotation of said cam in the opposite direction after said cam has been rotated in said one direction; said cam having a portion of its periphery shaped to cause movement of said cam follower after the selected length of time has elapsed in direction to allow movement of said pivotally mounted member to cause actuation of said releasably retaining means whereby said valve member moves to its closed position; and resilient means secured to said cam and bridging said shaped portion of its periphery preventing movement of said cam follower of said pivotally mounted member in the actuating direction when said cam is rotated in said one direction.

17. An automatic shutoff dispensing nozzle having an inlet and an outlet interconnected together by a valve seat, a valve member for opening and closing said valve seat, a pivotally mounted operating lever when in one position opening said valve member and when in another position closing said valve member, a spring actuated axially reciprocable plunger; said plunger pivotally mounting said lever to said nozzle, a latch member for locking said plunger in one position, a latch for holding said lever in one position, a timer means and mechanical means operatively interconnected to said timer means and to said latch member, said latch member being movable axially of said plunger into latching and unlatching position, a diaphragm adjacent said plunger carrying said latch member and moving said latch member into latching and unlatching position, said diaphragm being actuated either by air pressure or by said mechanical means, said mechanical means including a lever wherein one arm thereof is operatively connected to the diaphragm, and a cam follower and cam driven by said timing means, and the other end of said lever being actuated by said cam follower to actuate the diaphragm and move said latch member axially of said plunger and into said unlatched position after a predetermined time to close the valve.

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