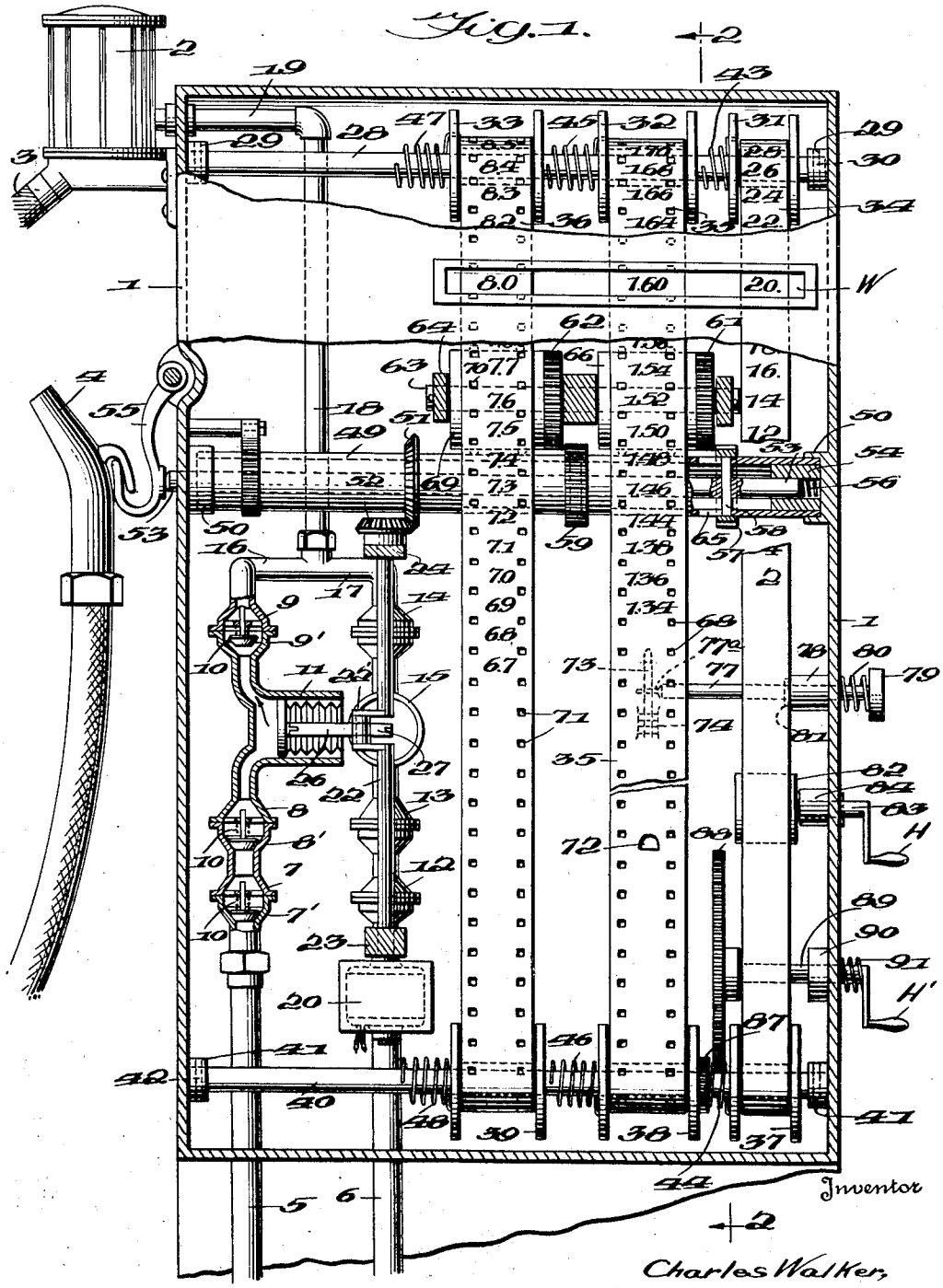
Oct. 17, 1939. C. WALKER 2,176,827

LIQUID DISPENSING APPARATUS

Filed Nov. 22, 1937 2 Sheets-Sheet 1

Fig. 1.



Oct. 17, 1939. C. WALKER 2,176,827

LIQUID DISPENSING APPARATUS

Filed Nov. 22, 1937 2 Sheets-Sheet 2

Fig. 2.

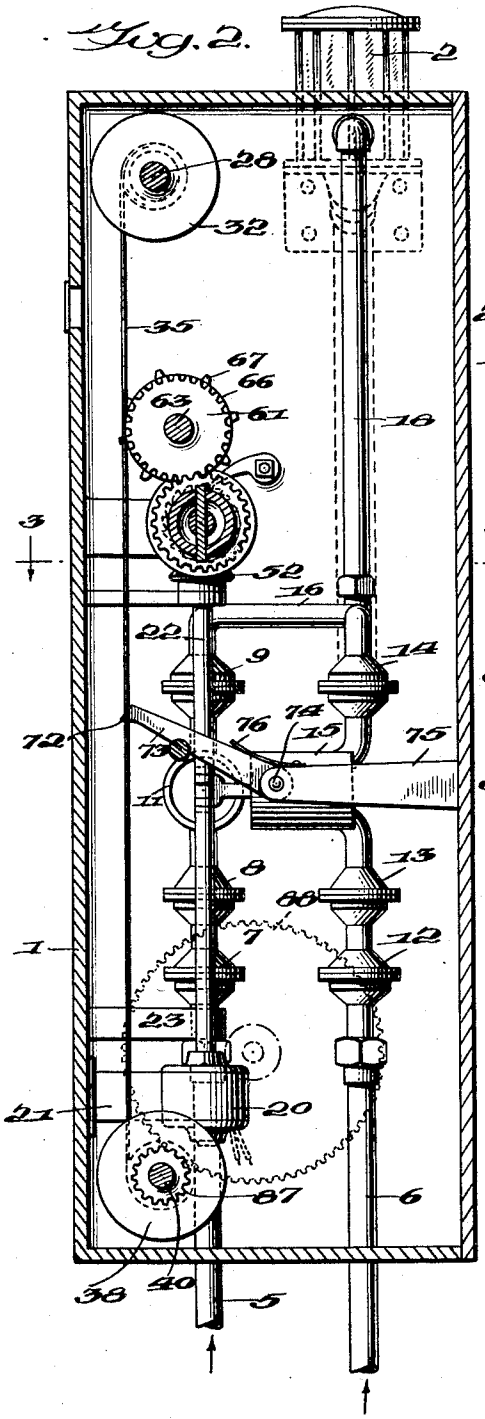


Fig. 3.

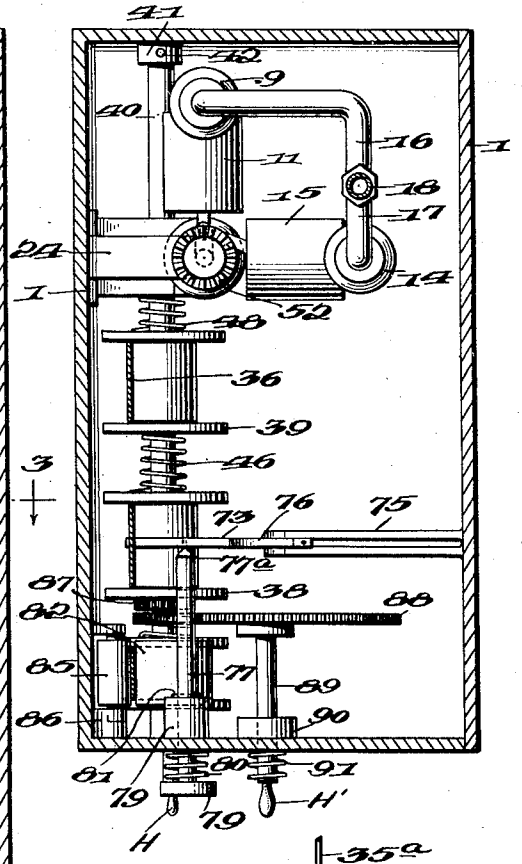
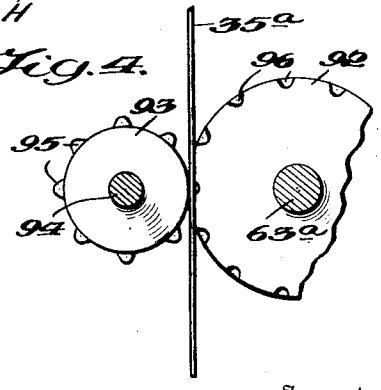


Fig. 4.



Inventor
Charles Walker,

By Prentiss & Prentiss

Attorneys

Patented Oct. 17, 1939

2,176,827

UNITED STATES PATENT OFFICE

2,176,827

LIQUID DISPENSING APPARATUS

Charles Walker, Knoxville, Tenn.

Application November 22, 1937, Serial No. 175,952

5 Claims. (Cl. 235—125)

My invention relates to new and useful improvements in liquid dispensing apparatus and more particularly to filling station pumps, and has for its object to provide a device of this character having registering mechanism cooperating with the pump to indicate to the purchaser, the amount of liquid dispensed as well as the price per gallon and total cost thereof.

Another object of my invention is to provide a novel pumping apparatus wherein the pumps are disposed a right angles to one another for delivering a steady stream of liquid to the delivery hose.

A further object is to provide a registering mechanism connected to the pump operating shaft, whereby the former is operated directly by the shaft, thus eliminating the use of expensive meters heretofore used in similar pumping apparatus.

Still another object lies in the construction of the registering mechanism in the form of strips of metallic tape wound upon oppositely disposed spools, said strips being provided with suitable indicia to indicate in tenths gallons, the volume dispensed, and the corresponding cost of the liquid dispensed, respectively.

Finally, it is the object of my invention to divide one of said strips into different computation zones to permit its use for varying prices per gallon of the liquid.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel features hereinafter set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views,

Fig. 1 is a fragmentary front view, partly in section, of a filling station pump, illustrating the pumping and registering mechanisms which form part of my invention.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 2, and

Fig. 4 is an enlarged detail of a modified form of sprocket arrangement for feeding the register tapes.

In the drawings,

1 indicates the casing of a filling station pump provided with the conventional sight gauge 2 and delivery hose 3 which terminates in a nozzle 4. Any conventional valve (not shown) may be provided in the nozzle for controlling the flow of liquid therethrough. Gasoline is delivered to the sight gauge by means of my novel pumping arrangement which comprises a pair of spaced vertical conduits 5 and 6 leading from a suitable source of supply not shown. Conduit 5 is provided with vertically spaced valve chambers 7, 8 and 9 to accommodate a series of conventional poppet valves 7', 8' and 9', respectively, normally held in closed or seated position by coiled springs 10.

Interposed in the conduit 5 at a suitable point between valve chambers 8 and 9, I install a pump 11 preferably of the bellows type but which may be of the piston type. The pump cooperates with the poppet valves 7', 8' and 9' to pump the gasoline up the conduit through the first two mentioned poppet valves, and force the same through the poppet valve 9' into the upper part of the conduit 5.

The conduit 6 is similarly provided with a series of vertically spaced valve chambers 12, 13 and 14 housing the conventional poppet valves not shown. This conduit is also provided with a bellows pump 15 disposed to operate at right angles to pump 11 for the purpose hereinafter set forth. The upper end of each of the conduits 5 and 6 terminates in short connections 16 and 17 which merge into a common vertical discharge conduit 18 leading to the sight gauge 2 through the medium of a connection 19.

20 designates an electric motor suitably mounted on a bracket 21 secured to the casing 1 and is connected to a vertical crankshaft 22 supported in bearings 23 and 24 also secured to the casing 1. The pumps 11 and 15 are operatively connected to the crank 22' of shaft 22 by means of connecting rods 26 and 27, respectively, whereby upon rotation of the crankshaft by the motor, each of the pumps will be rotated, and by virtue of their disposition at right angles to one another, as before stated, will deliver a steady stream of liquid into the discharge conduit 18 and ultimately into the discharge hose 3. If desired, two more pumps and conduits may be added to form two sets of oppositely disposed pumps, operating to discharge a greater stream of liquid into the discharge conduit 18.

The registering mechanism operating in conjunction with the pumping apparatus comprises a horizontal shaft 28 extending transversely across the casing 1 adjacent its upper end, said shaft being mounted in suitable supports 29 secured to the sides of the casing 1, and being keyed in said supports by means of pins 30 shown in dotted

lines in Fig. 1. Spools 31, 32 and 33 on which is wound the upper end of tapes 34, 35 and 36, respectively, are freely mounted on the shaft 28, and the other end of the tapes are wound respectively on spools 37, 38 and 39, freely mounted on a second horizontal shaft 40 extending transversely across the casing 1 at an intermediate point in the casing below the shaft 28. Shaft 40 is also mounted in suitable supports 41 secured to the sides of the casing and is keyed in said supports by means of pins 42.

The tape 34 carries suitable indicia to indicate the price per gallon of the gasoline, and this tape is held taut between the two spools 31 and 37 by suitable springs 43 and 44, respectively. Spring 43 is coiled about the shaft 28, being secured thereto at one end, its other end being fastened to the side of the spool 31, while spring 44 is coiled about shaft 40 and secured thereto, and to the side of the spool 37.

Similar springs 45 and 46 are provided on shafts 28 and 40, respectively, for the spools 32 and 38 to hold the tape 35 taut, which tape is provided with a series of computation zones having suitable indicia to indicate the cost of the gasoline dispensed based at different prices per gallon. Each zone represents a graduated computation in dollars and cents of the cost from one-tenth gallon to any volume desired, for instance, up to twenty gallons.

Tape 36, movable between the two spools 33 and 39, carries suitable indicia for indicating seriatim in tenths gallons, the volume of liquid dispensed. As in the case of the aforementioned price and cost tapes 34 and 35, tape 36 is held taut by means of springs 47 and 48 on the shafts 28 and 40, respectively.

The springs 43, 45 and 47 on the upper shaft 28 are preferably under a greater tension than the cooperating springs 44, 46 and 48 on the lower shaft 40, so that unless restrained by mechanism hereinafter described, the tapes 34, 35 and 36 will normally tend to be wound about their respective upper spools 31, 32 and 33.

49 represents a hollow shaft mounted transversely in the casing 1 in suitable bearings 50 at a point intermediate the shafts 28 and 40 and slightly behind the tapes. This shaft is provided with a bevel gear 51 keyed thereto and meshing with a complementary bevel gear 52 keyed to the upper end of the vertical crankshaft 22, whereby upon operation of the motor, the crankshaft and hollow shaft will be rotated together. A rod 53 extends longitudinally in the hollow shaft 49 and is supported therein in suitable bearings 54 provided in the shaft adjacent its ends, one end of said rod projecting through the side wall of the casing 1 in abutting engagement with a hook 55 pivoted to the outside wall of the casing 1 and adapted to support the nozzle 4 of the delivery hose 3. A spring 56 engaging the inner end of the rod, normally tends to force the latter to the left of Fig. 1 as will hereinafter appear.

At a suitable point adjacent the cost tape 35, I provide a gear 57 slidably mounted on the hollow shaft 49 and keyed to the inner rod 53 by means of a pin 58 which extends through the hollow shaft. A similar gear 59 is provided on the shaft 49 adjacent the volume tape 36 and is similarly keyed to the inner rod 53 by a suitable pin. These gears are adapted to engage and disengage complementary gears 61 and 62, respectively, mounted on a short shaft 63 located above shaft 49 and supported in bearings 64 formed in a bracket secured to the casing 1. In order to facilitate this engagement and disengagement of the gears, the pins 58 extend through longitudinal slots 65 in the shaft 49, whereby when the rod 53 is moved to the left of Fig. 1 by spring 56, the gears 57 and 59 will slip into engagement with their complementary gears 61 and 62.

A sprocket drum 66 extending across the entire width of the cost tape 35 is mounted on shaft 63 adjacent the gear 61 and is operatively associated with the latter so as to rotate therewith. The periphery of the sprocket drum carries two spaced rows of teeth 67 (Fig. 2) adapted to cooperate with a series of complementary notches or openings 68 provided along the vertical edges of the tape 35. 69 designates a similar sprocket drum extending across the width of the volume tape 36 and mounted on shaft 63 adjacent the gear 62 in operative association therewith. This second sprocket drum is also provided with two rows of teeth 70 about its periphery, adapted to engage in complementary notches 71 on the edges of the tape 36.

It will thus be seen that upon the removal of the nozzle 4 from the hook 55, the rod 53 will be moved to the left of Fig. 1, bringing the gears 57 and 59 in mesh with gears 61 and 62, respectively, to permit the sprocket drums 66 and 69 to move their respective tapes 35 and 36 downwardly upon rotation of the shaft 49 by the crankshaft 22, to successively bring adjacent a window W provided in the front of the casing 1, the cost and volume of the gasoline as it is being pumped.

As before stated, the indicia on the cost tape 35 is divided into a series of computation zones, based on different prices at which the gasoline may be sold, and each zone is separated from the next zone by a suitable opening 72 provided in the tape at a point intermediate the two vertical rows of notches 71, in line for engagement with a hook-like member 73 pivoted at 74 to a bracket 75 on the casing 1, being tensioned by spring 76. In Figs. 2 and 3 I have shown this hook in engagement with the opening 72 in the tape, and as therein clearly illustrated, the upper face of this hook member is beveled adjacent its free end to permit the tape to slip over the same upon the downward movement of said tape by the sprocket drum.

Referring to Figs. 1 and 3, the hook member 73 rests upon the reduced inner end of a transverse push rod 77 which projects outwardly through the side of the casing 1 and is adapted to reciprocate in a bearing 78 mounted in said casing. The outer end of the rod terminates in an enlarged head 79 which forms an adapter for a spring 80 interposed between the wall of the casing and said head to normally urge the rod outwardly, the limit of said outward movement being controlled by a pin 81 on the rod, adapted to abut the edge of bearing 78. Adjacent the reduced inner end, the push rod 77 is provided with a bevel portion 77a adapted to engage under and lift the hook 73 from engagement with the tape upon the inward movement of the push rod, for the purpose hereinafter set forth.

The price tape 34 is adjustable vertically between its spools 31 and 37 by means of a feed roll 82 provided on the inner end of a short transverse shaft 83 mounted in a suitable bearing 84 in the wall of the casing 1, at a point intermediate the spools and disposed immediately in back of the tape. The other end of the shaft projects outwardly through the wall of the casing and terminates in a crank portion forming a handle H. This feed roll cooperates with a friction roller

85 (Fig. 3) freely rotatable in bearings 86 on the casing and lying immediately in front of the feed roll 82 with the tape frictionally engaged therebetween, whereby upon rotation of the handle H in either direction, the tape will be moved vertically and retained by said rolls to bring the proper numeral adjacent the window W for indicating the current price per gallon of the gasoline.

Cost tape 35 is also adjustable vertically by suitable mechanism, to bring the proper computation zone corresponding to the grice per gallon, ready to be acted upon by the sprocket drum 66, which comprises a gear 87 freely mounted on the shaft 40 and suitably connected to one side of the spool 38. This gear is adapted to mesh with a complementary gear 88 keyed to the inner end of a short horizontal shaft 89 mounted in bearings 90 on one side of the casing and projects outwardly through the side wall thereof, terminating in a crank portion forming a handle H'. A spring 91, interposed between the crank and the casing normally forces the shaft outwardly with its gear 88 out of mesh with gear 87 on the spool. Thus, by forcing the shaft inwardly, its gear 88 will mesh with gear 87 to permit the tape 35 to be wound upon its spool 38 upon the clockwise rotation of handle H'.

For adjusting the tape in the other direction, the push rod 77 is forced inwardly by pushing against the head 79 to disengage the hook member 73 from the opening 72. The spring 45 being under a greater tension than the opposite spring 46, as before stated, the release of the hook 73 permits the spool 32 to automatically overcome the tension of spring 46 on the lower spool and wind the tape on spool 32 until the hook 73 engages the next opening. Hence the operation of the handle H' is unnecessary in adjusting the tape in an upward direction.

Having described the construction of my improved apparatus, its operation is as follows:

Assuming that the nozzle 4 is on the hook 55 and the registering mechanism has not previously been adjusted, the tapes 34, 35 and 36 indicating their zero position through the window W. Assuming further that the current price of the gasoline per gallon is twenty cents. The handle H is turned in a counterclockwise direction (Fig. 1) sufficiently to bring the numeral twenty on the price tape 34 adjacent the window, and by reason of the frictional engagement of the tape by the rolls 82 and 85, will be held in adjusted position.

The cost tape 35 is then adjusted to bring the corresponding twenty-cent computation zone ready to be acted on by the sprocket drum 66, which adjustment is accomplished by forcing the shaft 89 inwardly against the spring 91 to slip the gear 88 in mesh with gear 87. Handle H' is then rotated in a clockwise direction thereby rotating spool 38 in a counterclockwise direction and winding the lower end of the tape thereon. When the proper computation zone is brought into operative position, hook 73 engages the opening 72 in the tape and prevents the latter from being rewound on its upper spool by its spring 45 upon the disengagement of the gears 88 and 87. As heretofore explained, the beveled upper face of the hook 73 will permit the tape to slip thereover during its downward movement.

The nozzle is removed from its hook 5, permitting the rod 53 to be forced outwardly by its inner spring 56 to bring the gears 57 and 59 in mesh with their respective gears 61 and 62, after which the electric motor 20 is started by any suitable switch mechanism (not shown). The crankshaft 22, rotating with the motor, will operate the pumps 11 and 15, and through the medium of the cooperating bevel gears 51 and 52, will simultaneously rotate hollow shaft 49 and drive the sprocket drums 69 and 66 to progressively bring adjacent the window W, the amounts in volume and cost of the gasoline as it is being pumped into the delivery hose 3.

After the desired amount has been delivered, the motor is stopped and the nozzle is replaced on the hook 5, thereby forcing the rod 53 inwardly to disengage the gears 59 and 57 from the corresponding gears on the sprocket drums, and permit the springs 47 and 45 on the upper spools 33 and 32 to wind their respective tapes thereon. Although tape 35 will thus be returned to zero position, hook 73 will engage the proper opening 72 and prevent overrunning of the tape beyond its adjusted twenty-cent zone.

Should the price of the gasoline change from that at which the registering tapes are set, the price tape is adjusted by turning handle H and the cost tape is correspondingly adjusted by turning handle H' or operating push rod 77 in the manner hereinbefore described, to bring the respective computation zone into operative position, after which the cycle of operation above described is repeated.

In Fig. 4 I have shown a modified form of sprocket arrangement wherein the tape 35*a* extends between sprocket drum 92 mounted on shaft 63*a*, and an idler drum 93 mounted on shaft 94. In this form of my invention, the perforations along the edges of the tape are engaged by teeth 95 on the periphery of the idler drum 93 which cooperate with complementary recesses 96 on the periphery of drum 92.

The diameter of drum 92 is preferably greater than that of idler drum 93, whereby when the former is being rotated, a tooth on idler drum will enter a complementary recess in drum 92, and a succeeding tooth will enter a second complementary recess before the preceding tooth has become disengaged from its recess, thus insuring positive rotation of the idler drum and movement of the tape. This modified form of sprocket arrangement may also be used in connection with the volume tape 36 and operates in a similar manner.

While I have shown and described coil springs for rewinding the tapes on their upper spools, it will be understood that any other suitable mechanism may be employed with equal effect.

It will thus be seen that with my novel apparatus, I have entirely eliminated the use of expensive meters, and by graduating the indicia on the cost and volume tapes corresponding with the known output of the pumping mechanism, I have designed an accurate registering mechanism operated by and simultaneously with the pumping mechanism. The cost tape may be of any desired length to accommodate any number of computation zones, thus permitting of its use for any changes in price of the gasoline.

If desired, I may provide a single tape carrying indicia to indicate the volume along one edge thereof, and also carrying indicia along its other edge to indicate the cost, and this single tape may be divided into zones based on different computations. On the other hand, I may provide a series of such tapes, based on different computa-

tions, interchangeable for different prices of the gasoline dispensed.

From the foregoing it is believed that the construction and advantages of my invention may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details disclosed without departing from the spirit of my invention as set out in the following claims.

What I claim and desire to secure by Letters Patent is:

1. Registering mechanism comprising oppositely disposed supply and take-up spool members, tape means wound on said supply spool, and secured at its opposite end to said take-up spool, said tape means being divided into a plurality of zones, means for adjusting said tape for operation within a selected zone, means for paying out said tape, a prime mover for operating said paying-out means, clutch means for connecting and disconnecting said prime mover and said paying-out means, tension means on each of said spool members for winding the latter in opposed directions, the tension on said supply spool being greater than that on said take-up spool, whereby upon the release of said clutch means, said tape will be rewound on said supply spool, and a brake member for preventing the return of said tape beyond a predetermined position in the selected zone.

2. Registering mechanism as claimed in claim 1 including means for releasing said brake member to permit rewinding of said tape beyond a selected zone.

3. Registering mechanism comprising oppositely disposed supply and take-up spool members, tape means wound on said supply spool and secured at its opposite end to said take-up spool, said tape means being divided into a plurality of longitudinally spaced zones, means for adjusting said tape for operation within a selected zone, means for paying out said tape, a prime mover for operating said paying-out means, a clutch for connecting and disconnecting said prime mover and said paying-out means, tension means on each of said spool members for winding the latter in opposed directions, the tension on said supply spool being greater than that on said take-up spool, whereby upon the release of said clutch, said tape will be rewound on said supply spool, and means for confining the movement of said tape within the selected zone.

4. In a filling station pump, registering mechanism comprising oppositely disposed supply and take-up spool members, tape means wound on said supply spool and secured at its opposite end to said take-up spool, said tape means being divided into a plurality of longitudinally spaced zones, means for adjusting said tape for operation within a selected zone, sprocket apertures along the edges of said tape, a sprocket drum cooperating with said apertures for paying out said tape, a prime mover for operating said sprocket drum, a clutch for connecting and disconnecting said prime mover and said sprocket drum, tension means on each of said spool members for winding the latter in opposed directions, the tension on said supply spool being greater than that on said take-up spool, whereby upon the release of said clutch, said tape will be rewound on said supply spool in opposition to the tension force on said take-up spool, and means for confining the movement of said tape within the selected zone.

5. In a filling station pump, registering mechanism comprising oppositely disposed supply and take-up spools, a flexible tape wound on said supply spool and secured at its other end to said take-up spool, said tape being divided into a plurality of longitudinally spaced zones, an aperture in said tape separating each of said zones, means for adjusting said tape for operation within a selected zone, means for paying out said tape from said supply spool, tension means on said take-up spool for winding said tape thereon as it is paid out by said paying-out means, a prime mover for operating said paying-out means, a clutch for connecting and disconnecting said prime mover and said paying-out means, tension means on said supply spool overcoming the tension means on said take-up spool for rewinding said tape on said supply spool upon the release of said clutch, and a lever cooperating with the respective aperture in said tape for preventing the return of the latter beyond the selected zone.

CHARLES WALKER.