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[33] **France**
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[54] **PREPAYMENT DEVICE FOR THE REMOTE CONTROL OF A DISPENSER**
8 Claims, 2 Drawing Figs.

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[50] **Field of Search** 194/3, 13, 5; 222/20

[56] **References Cited**
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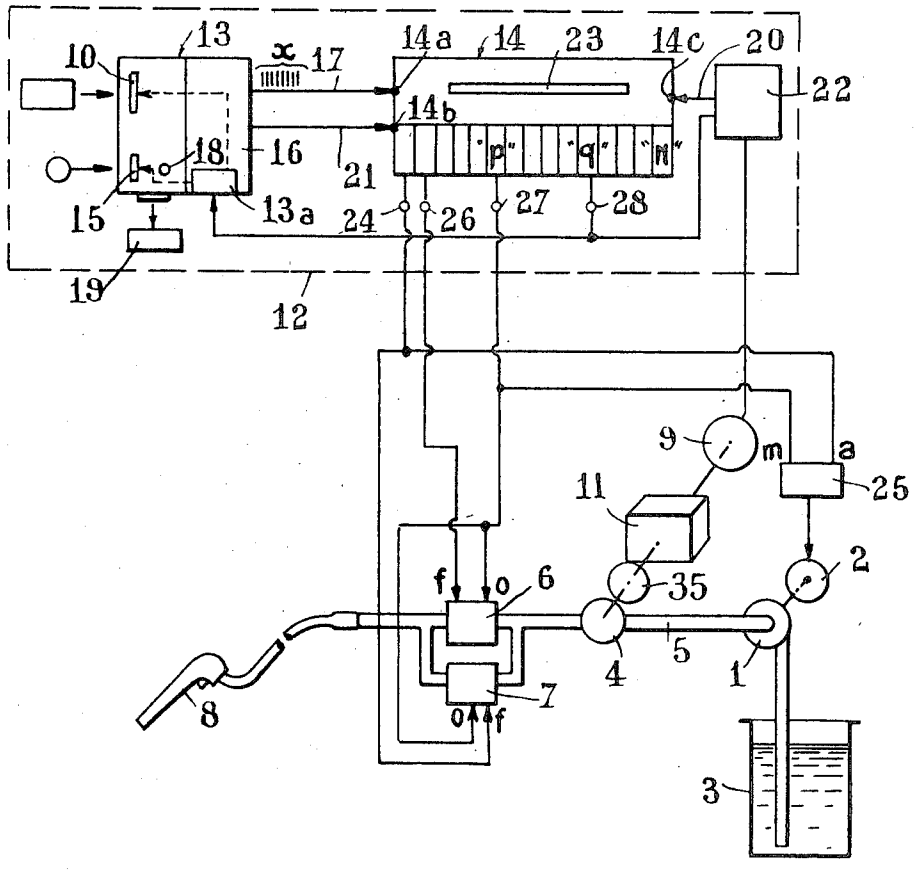
ABSTRACT: A prepayment device for the remote control of an apparatus for dispensing a product, notably liquid fuel, comprising a pulse emitter driven from a volumetric counter and producing a number of pulses proportional to the quantity of product delivered by an apparatus, and a remote control unit comprising essentially a money-collecting device adapted to receive coins and/or banknotes, and emitting at its output end electric pulses, the number of which corresponds to the monetary value of the coins and/or banknotes introduced into said collecting device, and a counter having two progression directions and comprising a first counting input connected to the output of said collecting device, and a second reverse counting input connected to the output of the emitter driven from the volumetric counter of the dispensing apparatus.



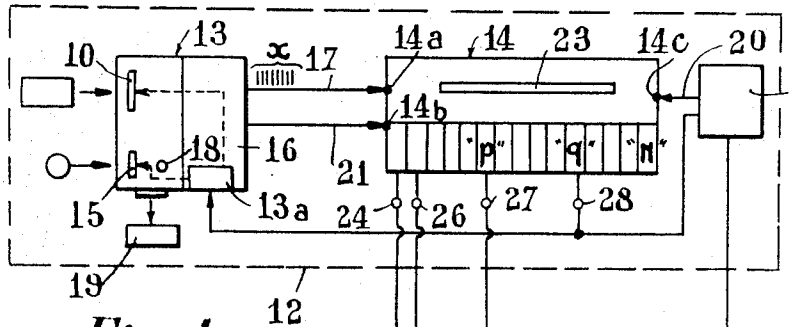


Fig. 1

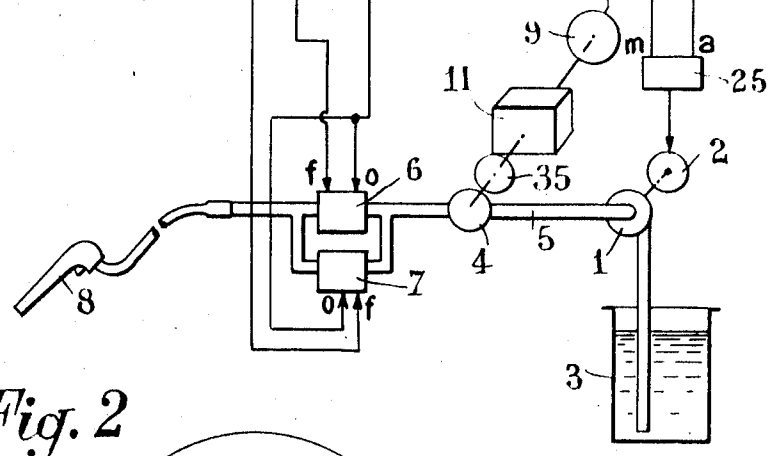
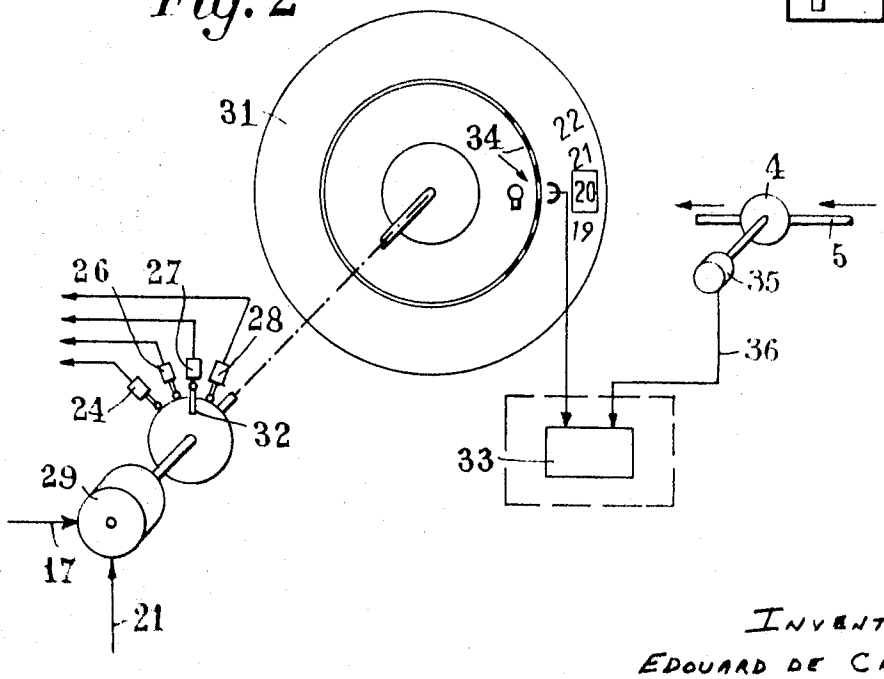


Fig. 2



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PREPAYMENT DEVICE FOR THE REMOTE CONTROL OF A DISPENSER

BACKGROUND OF THE INVENTION

The present invention relates to prepayment devices for the remote control of an apparatus for dispensing a liquid, gaseous, pulverulent or other product, to be delivered continuously or intermittently.

This invention is concerned more particularly but not exclusively with a device for the remote control of a liquid fuel dispensing apparatus. In fact, in this case if the prepayment device is to be designed to accept banknotes, it must include electronic means that cannot be enclosed in an antideflagration enclosure housed within the dispensing apparatus or disposed in close vicinity of this apparatus, as required by safety regulations from public services for liquid fuel dispensing apparatus.

SUMMARY OF THE INVENTION

It is the essential object of this invention to avoid this difficulty.

To this end, the prepayment device according to this invention for the remote control of an apparatus for dispensing a product, notably liquid fuel, said apparatus comprising an electric motor driving a member for dispensing said product and a volumetric counter constantly showing the quantity of product delivered by the apparatus, is characterized in that it comprises a pulse emitter driven from said volumetric counter and producing a number of pulses proportional to the quantity of product delivered by the apparatus, and a remote control unit comprising essentially a money-collecting device adapted to receive coins and/or banknotes, and emitting at its output end electric pulses, the number of which corresponds to the monetary value of the coins and/or banknotes introduced into said collecting device, and a counter having two progression directions and comprising a first counting input connected to the output of said collecting device, and a second reverse-counting input connected to the output of said collecting device, and a second reverse-counting input connected to the output of the emitter driven from the volumetric counter of the dispensing apparatus, the counter of the remote control unit further comprising a plurality of output terminals connected to a device controlling the energization of the electric motor of the dispensing apparatus and also to members controlling the outflow of the product, whereby the dispensing apparatus can be started automatically and capable of dispensing the quantity of product corresponding to the monetary value of the coins and/or banknotes introduced into the collecting device of the remote control unit.

In case of the automatic distribution of liquid fuel, according to the present invention the money-collecting device equipped with electronic means for analyzing the banknotes can be installed outside the area considered as dangerous near or around the dispensing apparatus proper, and inside this apparatus a compact antideflagration device of a type easily adaptable to commercial counters. A simple solution consists for example in adapting to the counter wheel measuring the smallest quantities (i.e. the hundredth) a toothed wheel revolving in close proximity to an electromagnetic pickup constituting a pulse transmitter and connected to the remote control unit.

Thus, with this invention it is possible to sell automatically liquids, notably liquid fuels, by quantities corresponding to the banknotes and coins previously introduced into the prepayment device.

BRIEF DESCRIPTION OF THE DRAWING

A typical form of embodiment of the invention will now be described by way of example with reference to the accompanying drawing, in which:

FIG. 1 is a block diagram showing the essential component elements and circuitry of a prepayment device for the remote control of a liquid fuel-dispensing apparatus, and

FIG. 2 is a diagram illustrating a specific form of embodiment of one portion of the installation.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, there is shown diagrammatically therein an apparatus for dispensing liquid fuel which comprises essentially a pump 1 driven from an electric motor 2 and drawing the liquid fuel from a tank 3, a volumetric counter 4 connected to the supply pipeline 5, a main electromagnetic valve 6 and a low-output electromagnetic valve 7, both valves being connected in mutual parallel relationship downstream of the volumetric counter 4, and a dispensing nozzle or similar device 8.

A pulse emitter 9 is rotatably driven from the volumetric counter 4 and adapted to deliver a number of pulses proportional to the volume of fuel dispensed by the apparatus. The coefficient of proportionality is the cost of the liquid fuel to be sold. This coefficient is introduced by means of a mechanical connecting device 11 interposed between the volumetric counter 4 and the pulse emitter 9. This pulse emitter 9 may be of any known and suitable type, for example of the electric, photoelectric, magnetic, electromagnetic release type, etc.

The pulse emitter 9 is connected to a remote control unit designated by the reference numeral 12 as being contained in the dashline rectangle denoted by this numeral. This unit is installed at a certain distance from the dispensing apparatus proper, and comprises essentially a money-collecting device 13 and a counter 14 having two progression directions.

The collecting device 13 comprises one or a plurality of slots 10 for receiving the banknotes, and one or a plurality of slots 15 for receiving the coins. This collecting device 13 further comprises an electronic unit 16 of known construction capable of analyzing the banknotes introduced through the slot 10 so as to detect their actual monetary value and to convert this value, as well as that of the coins introduced through the slots 15, into a series of pulses fed at its output end to a conductor 17.

The number of pulses emitted through this output conductor 17 is proportional to the value of the coins and/or banknotes introduced into the apparatus. Thus, for instance two dollar note introduced into the apparatus, will cause, upon completion of the decoding operation performed by the electronic analyzer 16, for example 10 pulses to be fed to conductor 17. Similarly, a 1 dollar coin introduced into the apparatus is attended by the transmission of 5 pulses.

The collecting device 13 also comprises a refund or coin-return button 18 adapted to be depressed by the user before the latter has begun to take liquid fuel from the apparatus and wishes to recover the banknotes and/or coins previously introduced into the apparatus. Thus, depressing the button 18 will cause the banknotes and/or coins to be dropped into a drawer 19 and simultaneously the emission of a specific signal for resetting the apparatus to zero via an output conductor 21.

Both conductors 17 and 21 are connected to the counter, the former to a counting input 14*a* and the latter to a resetting input 14*b*, thereof this counter 14 further comprises another reverse-counting input 14*c* connected to the pulse emitter 9 of the dispensing apparatus via a conductor 20 and a device 22 of which the function will be explained presently. The counter 14 is also provided with a device 23 for displaying the preset number, whereby the user can check at any time the value preset in the counter.

The counter 14 which may be of any known and suitable type comprises N stages, N being the maximum capacity of the counter. Some of these stages are connected to output terminals where electric signals having certain predetermined functions appear. The output 24 of the first stage of counter 14 is connected to the "Stop" input *a* of a device 25 controlling the electric energization of motor 2 draining the pump

1. This output terminal 24 is also connected to a terminal *f* controlling the closing of the idle electromagnetic valve 7.

An output terminal 26 of a stage adjacent to said first stage of the counter, for example the second stage, is connected to one closing terminal *f* of the main electromagnetic valve 6.

Another output terminal 27 of a stage of row *p* is connected on the one hand to the "ON" input *m* of the device 25 controlling the energization of electric motor 22, and on the other hand to the opening terminals *o* of the main and low-output electromagnetic valves 6 and 7, respectively.

Finally, an output terminal 28 of a stage pertaining to row *q*, (*q* being greater than *p* and smaller than N) is connected to a device 13*a* adapted to block the slots 10 and 15 of the money collecting device 13.

Now the mode of operation of the device of this invention will be described with reference to the drawing.

In the inoperative condition the counter 14 is at zero position and the pump 1 is inoperative as well, both valves 6 and 7 being closed.

When the user is desirous to obtain the delivery of a quantity of liquid fuel corresponding to a sum of *x* cents or dollars, he introduces one or several coins into the slot 15 of collecting device 13, and/or one or more banknotes into the slot 14. Upon each introduction and subsequent collection of a coin and/or banknote, the monetary value thereof is converted into a proportional number of pulses transmitted via conductor 17 and fed to input 14*a* of counter 14. This counter will thus totalize *x* pulses, assuming that each elementary pulse corresponds for instance to 10 cents, taken for example as the elementary money value. As already mentioned hereinabove, the user can recover his money, i.e. the coins and/or banknotes introduced into the device, by depressing the money-back button 18, unless he has begun to take delivery of the fuel liquid. If he depresses the button 18, the coins and/or banknotes are dropped into the drawer or like receptacle 19 and simultaneously at least one special resetting pulse is emitted via conductor 21 for resetting the counter 14.

Assuming that the user has introduced banknotes and coins for a total value of *x* cents into the collecting device 13, the counter 14 will totalize *x* pulses, as already explained in the foregoing. If this number *x* exceeds the value *p* corresponding to the value set for a minimum fuel delivery, the latter can take place. In fact, when the count registered in the counter 14 exceeds this value *p*, the output 27 is energized and starts the motor 2 driving the pump 1 while opening the two electromagnetic valves 6 and 7. Under these conditions, the user can initiate the dispensing of liquid fuel and the liquid output through pipe line 5 causes the rotation of the volumetric counter 4. This counter 4 drives in turn, via mechanical coupling means 11, the pulse emitter 9 so that pulses are fed to conductor 20 and to the reverse-counting terminal 14*c*. Each pulse corresponds to the delivery of a quantity of liquid proportional to the elementary value of the money, for example, 10 cents in the case contemplated. The pulses fed to the reverse counting terminal 14*c* cause the counter 14 to be reset or returned to zero. When the count registered by counter 14 approaches and is nearly zero, the output 26 is energized, thus closing the main electromagnetic valve 6, so that the low-output valve 7 alone remains open. In other words, this valve 7 allow only a reduced output to pass therethrough, whereby any undesired hammering can be avoided while increasing the precision of the fully closed condition. When the counter 14 has actually resumed its zero position the output 24 is energized to control the stopping of motor 2 and therefore of pump 1, and simultaneously the deenergization of the electromagnetic idling valve 7. Thus, the liquid fuel output is stopped completely and no further pulse can be emitted.

As explained in the foregoing, the output 28 of the stage corresponding to the registration of value *q* is connected to the device 13*a* for blocking the money-collecting device 13. This value *q* is selected to prevent the maximum capacity of counter 14 from being overstepped at any time. Thus, for instance, if the counter is set for registering no more than 45 pulses corresponding to a value of, say 9 dollars, the value *q* whereat this blocking action takes place is selected to correspond to "36," so that when this value has been registered by the counter 14 the device will prevent the user for introducing additional money, such as 2 dollars, into the slot 10, since this introduction would cause the apparatus to exceed the counter's capacity.

Similarly, the device 22 connected to the pulse emitter 9 detects the first pulse emitted thereby and causes immediately the money-collecting device 13 to be locked; this device 13 will be unlocked subsequently but only when the counter 14 is reset to zero. Then, the action of return button 18 is neutralized and the user cannot recover his money. Besides, if the tank 3 were emptied during a filling or like dispensing operation, the device 22 would keep the collecting device 13 in its blocked condition, thus preventing another user from inserting other coins and/or banknotes into the device, as long as the pump 1 does not deliver liquid fuel and the counter 14 has hot been reset.

FIG. 2 illustrates some of the component elements of a specific form of embodiment of the device constituting the subject matter of this invention. In this example, the counter 14 having two directions of progression comprises a step-by-step motor 29 rotatably driving a disc 31 carrying a sequence of numerals moving past a window, whereby the registration and the display of the values can be obtained simultaneously. The motor 29 is connected to conductor 17 receiving the pulses from the money-collecting device 13 and these pulses tend to rotate said motor in the increasing or counting direction (clockwise direction as seen in the figure). The motor 29 is also connected to conductor 20 receiving pulses from emitter 9, these pulses tending to rotate the motor in the decreasing or reverse-counting direction (counterclockwise direction as seen in the drawing). The conductor 21 receiving the resetting pulses is also connected to motor 29.

The motor shaft drives a stud 32 controlling electric microswitches 24, 26, 27 and 28 corresponding to the outputs denoted by the same reference numerals in FIG. 1. These microswitches provide the various control actions disclosed hereinabove.

A safety device is provided for reducing to a negligible value the consequences of a failure in the reverse-counting signals. This device comprises a two input electronic circuit 33 of which one input receives via a conductor 36 the pulses emitted from an emitter 35 responsive to the shaft driving the volumetric counter 4. The other input of the electronic circuit 33 receives pulses produced by a pulse generator 34 monitoring the operation of the step-by-step motor 29 acting as the counter 14. This monitoring pulse generator 34 may be of the photo electric type. It comprises in this case a photocell disposed on one side of disc 31 and registering with a sequence of holes formed through this disc at relative spacings corresponding to the value of one step of motor 29, and also of a light source illuminating said cell and disposed on the opposite side of disc 31. Under these conditions, each one-step rotation of motor 29 causes the photocell of pulse generator 34 to emit a pulse fed to the electronic circuit 33.

This electronic circuit 33 receives at its two inputs the pulses from emitters 35 and 34, and operates in such a way as to cause the pulses received from emitter 35 in connection with volumetric counter 4 to control the "sensitization" of a cutout circuit inserted in the mains supply line. On the other hand, the pulses produced by the photoelectric generator 34 are adapted to cancel this sensitization.

If the circuit 33 receives several pulses from emitter 35, say three pulses, without receiving any pulse from the photoelectric generator 34, this proves that a fault has occurred in the transmission line. Thus, the cutout circuit operates and the apparatus is rendered inoperative.

It will be readily understood by those conversant with the art that various modifications and variations may be brought to the specific forms embodiment of this invention which are shown and described herein, without departing however from the scope of the invention as defined in the appended claims.

What I claim is:

1. A prepayment device for the remote control of an apparatus for dispensing a product, notably liquid fuel, which comprises a member for delivering said product, an electric motor driving said member, a volumetric counter displaying the quantity of product delivered by said member, a pulse emitter driven from said volumetric counter and producing a number of pulses proportional to the quantity of product delivered by said member, a remote control unit comprising a money-collecting device adapted to receive coins and/or banknotes, and to emit at its output electric pulses the number of which corresponds to the monetary value of the coins and/or banknotes introduced into said collecting device, and a multistage counter having two directions of progression and comprising a first counting input connected to the output of said collecting device, a second reverse counting input connected to the output of the pulse emitter driven from said volumetric counter and a third resetting input, a plurality of output terminals of the respective stages of said counter, a device drivingly connected to said member for controlling the energization of said electric motor, said motor energization control device comprising two inputs, namely an ON input and an OFF input respectively, connected to the outputs of a first stage of row *p* and of the first stage of said counter of said remote control unit, and means controlling the outflow of said product which are connected to the stage outputs of the counter of said remote control unit, whereby said dispensing apparatus can be started automatically and deliver the quantity of product corresponding to the value of the coins and/or banknotes introduced into the collecting device of said remote control unit.

2. A device as set forth in claim 1, which comprises, in said collecting device, a coin-return button controlling, as long as the delivery of said product has not begun, the refund of any banknotes and/or coins introduced into said collecting device, and also the emission of at least one resetting pulse fed to the resetting input of the counter of said remote control unit.

3. A device as set forth in claim 1, which comprises means for detecting the emission of the first reverse-counting pulse delivered by the pulse emitter driven from said volumetric counter, and in said collecting device a blocking mechanism connected to said first pulse detecting means, whereby said collecting device is prevented from receiving further coins and/or banknotes when said first reverse-counting pulse has been emitted.

4. A device as set forth in claim 3, wherein said collecting device blocking mechanism is connected to the output of a stage of predetermined row *q*, greater than, said row *p*, of said counter of said remote control unit.

5. A device as set forth in claim 1, which comprises, in the case of a liquid product to be dispensed, notably a liquid fuel, a supply pump, an electric motor drivingly connected to said supply pump, a device controlling the energization of said motor, said last-named control device comprising an OFF input connected to the output of the first stage of said remote control unit counter, and an ON input connected to the output of the counter stage of row *p*, a low-output electromagnetic valve and a main-output electromagnetic valve, said valves being connected in parallel downstream to said supply pump each having a valve opening terminal and a valve closing terminal, the opening terminals of said valves being jointly connected to the row *p* stage output of said counter of the remote control unit, the closing terminal of said low-output valve being connected to the first stage output of said counter and the closing terminal of said main-output valve being connected to the output of another stage close to said first stage of said counter, so as to energize said electric motor and open said valves when a signal appears at the output of the row *p* stage of said counter, to close said main-output valve alone when an electric signal is emitted from the output of the stage close to said first counter stage, and finally to stop said motor and close said low-output electromagnetic valve when an electric signal appears at the output of the first stage of said counter.

6. A device as set forth in claim 1, which comprises a computer disposed between said volumetric counter and said pulse emitter.

7. A device as set forth in claim 1, wherein the counter of said remote control unit comprises a step-by-step motor having two directions of rotation, a rotary disc carrying display numerals and driven from said motor, a stud rotatably driven from said motor, and microswitches disposed around and actuated by said stud.

8. A device as set forth in claim 7, which comprises a generator of monitoring pulses rotatably driven from said step-by-step motor, a two-input electronic device having one input connected to the output of said generator of monitoring pulses and the other input connected to the output of said pulse emitter driven from said volumetric counter, said electronic device being adapted to emit a signal controlling the stoppage of said dispensing apparatus when a lack of synchronism is detected thereby between the pulses fed to said two inputs.