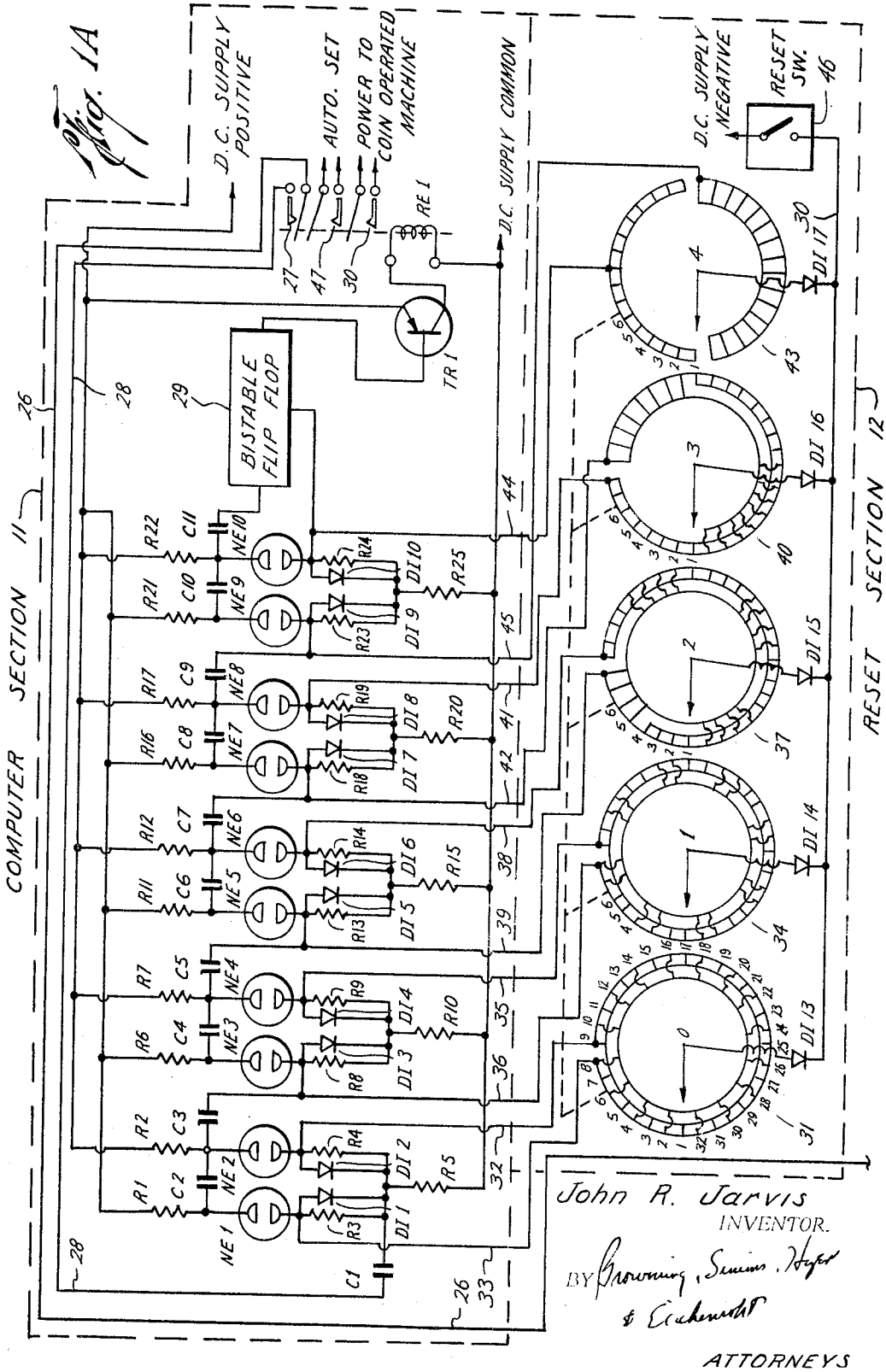
Oct. 18, 1966 J. R. JARVIS 3,279,480

ELECTRONIC COIN TOTALIZER

Filed Jan. 29, 1965 2 Sheets-Sheet 1



John R. Jarvis
INVENTOR.

BY Browning, Simms, Hyer & Eichenlaub

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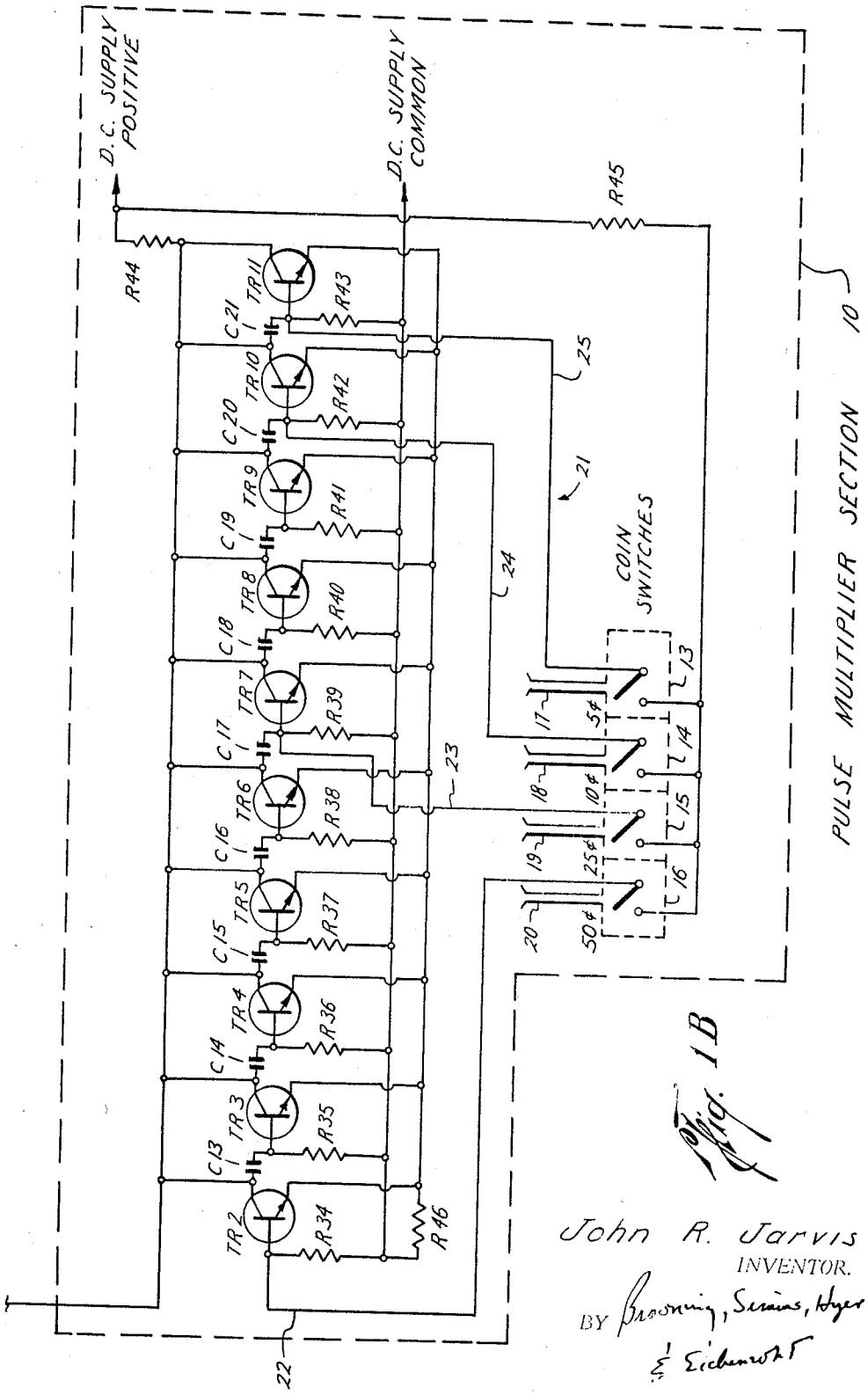


Fig. 1B

John R. Jarvis
INVENTOR.

BY Browning, Sessions, Hyer & Eichenlaub

ATTORNEYS

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ELECTRONIC COIN TOTALIZER

John R. Jarvis, Dallas, Tex., assignor to Meter-All Mfg. Co., Inc., Dallas, Tex.

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This invention relates to an electronic coin totalizer which accepts coins of different denominations and when the value of the deposited coins accumulates to a certain sum, a signal is generated to initiate an operation of a coin-operated machine or the like. In another of its aspects, this invention relates to such a totalizer which can be easily adjusted to change the total value of coins which must be deposited before the signal is generated.

In the operation of many coin-operated machines, the deposit of more than a single coin is required. In many instances, coins of two or more denominations must be deposited in order to accumulate the necessary credit for operating the machine. For example, if the charge is 65 cents, coins of three denominations must be deposited. In addition to handling several denominations of coins, it is desirable that a totalizer be of such construction that the total coin value necessary to initiate the machine's operation can easily be changed. For example, the coin-operated machine's owner may want to run "specials" on certain days of the week. He will therefore desire to periodically change the set value of the totalizer.

Various mechanical totalizers have been suggested for accomplishing the foregoing functions. Many of these have been relatively complicated and all have been subject to mechanical maintenance costs inherent in such type of equipment.

It is an object of this invention to provide a simple, flexible, low cost coin totalizer using electronic components thereby reducing maintenance costs and improving dependability.

Another object is to provide such a totalizer which can not only accommodate different denominations of coins but which can be readily and positively adjusted to change the total value of the coins deposited required to initiate a machine's operation.

Another object is to provide such a totalizer which can be very compact and yet which is adjustable over a broad range as to the total value of coins required to initiate operation.

Other advantages and features of the invention will be apparent to one skilled in the art upon consideration of the specification, the appended claims and the attached drawing wherein there is shown a preferred embodiment of the invention.

As indicated in the drawing, the embodiment includes a pulse multiplier section **10** whose function is to sense the deposited coins and to generate a number of pulses proportional to the denomination of the coins. For example, one pulse can be generated for a nickel, two for a dime, five for a quarter and ten for fifty cents. These pulses are fed to a computer section **11** which includes a decade counter to count the pulses. When the decade counter has counted a number of pulses equivalent to the total coin value to be deposited to operate the machine, the counter will emit a signal which can be used to initiate the operation of the coin-operated machine. After this, a reset pulse is applied to a reset section **12** which causes the computer section **11** to be reset and thereby condition it for the receipt of pulses involving another transaction. The reset section includes switch means arranged so that the total value of the coins to be deposited to cause the counter to count out and initiate operation of the machine, can be readily changed.

Turning now to a more specific description, the pulse multiplier section is shown as including a plurality of coin

switches **13**, **14**, **15** and **16**. These coin switches are arranged in conjunction with coin receiving means (e.g. chutes) **17–20** so that when a coin is dropped into one of the chutes, it momentarily closes one of the coin switches thereby completing a circuit to send a pulse to the pulse multiplier (designated generally by the numeral **21**). This multiplier is illustrated as a series of RC coupled NPN transistors arranged in cascade with the number of stages equal to the total number of pulses desired to be generated. In this particular instance, it is desired that ten pulses be generated for the fifty cent piece. Accordingly, the fifty cent coin switch is connected via wire **22** to the first stage. When a fifty cent coin is deposited, switch **16** will momentarily close thereby providing a positive impulse to the base of TR2, causing the collector to draw current through R44. At the same time, capacitor **13** is discharged to a lower value. This results in a negative pulse which is applied to the computer section as described below. When the coin switch opens, TR2 stops conducting and the voltage at TR2's collector increases. TR3 then conducts (resulting in a second negative pulse) until C13 is again charged. Then at this point, TR3 stops conducting and TR4 then conducts. As each transistor in turn goes from conduction to off, a pulse appears across R44.

In a similar manner, the twenty-five cent coin switch is connected via wire **23** to the fifth stage so that the deposit of a twenty-five cent coin will cause five pulses to be emitted. Also, the ten cent and five cent coin switches are connected to the ninth and tenth stages by wires **24** and **25** respectively, so that deposit of a dime and a nickel will respectively cause two pulses and one pulse to be emitted.

While one form of pulse multiplier has been illustrated, it will be appreciated that other forms can be used in the combination, the principal requirement being that the number of pulses are proportional to the denomination of the coins deposited.

The pulses emitted by the pulse multiplier are counted in the computer section which is illustrated as a five stage binary decade counter. Thus, the pulses pass via wire **26** and the contact **27** of relay RE1, which is normally spring biased to the position shown, and then via wire **28** and capacitor C1 to the first stage of the binary counter. This counter is of conventional construction and, in this instance, is illustrated as employing neon bulbs as the switching elements. Of course, transistors or other switching means can be used.

The first pair of neon bulbs provide the first stage of the computer and since all succeeding stages operate in the same manner, only the first stage will be described in detail.

In normal state (before counting starts), the first stage is in one mode with the neon bulb NE2 conducting and as a result in drawing current through R2, R4 and R5. Therefore the junction of R2 and C2 is at a lower potential than the junction between R1 and C2. As a result, C2 is charged to be positive on the R1 side. Current drawn through the common resistor R5 raises the potential on the cathode of the neon bulb NE1 and thus there is not enough voltage to fire this bulb. To create a flip-flop and place the first stage in its second mode, a negative pulse is fed to C1 from the pulse multiplier section thereby overcoming the positive bias on NE1. NE1 then fires which discharges C2 causing NE2 to cut off. The second negative impulse from the pulse multiplier causes the first stage to reverse. This time when NE2 fires, a negative pulse is delivered to C3, thus firing NE3 and reversing the second stage. The computer continues this form of operation counting in binary from each input impulse pulse C1 until the total capacity (n pulses) of the counter has been reached. At this time, NE10, which previously has

been cut off, will fire sending a negative pulse via C11 to the bistable multivibrator or flip-flop 29 causing it to forward bias TR1. The resulting conduction of TR1 is sufficient to energize relay RE1 causing it to reverse its contacts. This causes contact 30 to be closed thereby closing the power circuit to the coin-operated machine being controlled. The circuit remains in this condition until it is reset as described below.

Thus there is provided a decade counter having a total capacity of counting *n* pulses which in the illustrated embodiment is 32. This is the equivalent of requiring $1.60 in coins to be deposited to energize the coin-operated machine. In order that the coin value which must be counted to cause the computer to emit the signal energizing the control means RE1 may be less than that equivalent to *n* pulses, reset means are provided to store a count, which can be varied, in the computer.

The illustrated reset section includes a singe pole, multiposition, five deck wafer switch. The wipers of the respective decks are connected to a line 30 via diodes DI13 through DI17 respectively, in order that a negative reset pulse can be applied to the wipers to reset the computer section as will be described. The respective decks are connected to the binary stages so as to apply the negative reset pulse thereto in such a manner that, depending upon the setting of the switches, the counter can be reset to insert a coin value, represented by a binary number, which is the difference between the total coin value which can be counted by the computer and the value of the transaction. Thus, deck 31 has alternate contacts (odd numbered) connected to neon bulb NE2 by wire 32 and its remaining contacts (even numbered) connected to neon bulb NE1 by a wire 33. In this manner, when the wiper is positioned on an odd numbered contact, the negative reset pulse will be applied to the cathode of NE2 to position this particular binary stage in the 1 position. On the other hand, if the wiper of deck 31 is on an even numbered contact, the negative pulse will be applied to the cathode of NE1 to position the binary stage in the 0 position. Similarly, deck 34 has alternate pairs of its contacts connected to neon bulb NE4 by wire 35 with the other alternate pairs being connected to neon NE3 by wire 36. Deck 37 has alternate groups of four of its contacts connected to NE6 by wire 38 and the remaining groups of four to NE5 by wire 39. Deck 40 has alternate groups of eight of its contacts respectively connected to NE8 and NE7 by wires 41 and 42, while deck 43 has half (16) of its contacts connected to NE10 by wire 44 with the other half to NE9 by wire 45. It will thus be seen that the decks are connected in binary sequence to the respective binary counter stages. Thus with the wiper set on the number 1 contact, the reset pulse will condition the counter so that only one additional pulse will be required to be supplied by the deposit of a coin in order that the relay RE1 will be energized. The number 1 position can be termed the nickel position because it requires only one pulse. On the other hand, with the wipers set on the number 10 position, ten additional pulses will be required and this will be satisfied when a coin value totaling fifty cents is deposited.

Thus it will be seen that the counter can be reset to require a total number of pulses for count-out within the range of 1 to 32. In this manner, the coin value required to complete a transaction can be readily adjusted by simply turning a dial to set the reset switches.

The application of the negative reset pulse can be controlled by a suitable switch 46 which can be closed by the coin operated machine during or upon the completion of the transaction. For example, where the control machine is a washer, the conventional timer in the washer can be utilized to momentarily close switch 46 at the end of the washing cycle. Where the coin operated machine requires only a momentary pulse to initiate its operation, an additional contact 47 can be provided for relay RE1 so that when the relay is energized to close on contact 30 to energize the machine, it will also close on contact 47 to energize a circuit (not shown) to momentarily close switch 46.

While a five stage binary counter has been shown, it will be appreciated that a lesser or greater number of stages can be employed depending upon the range of adjustment required and upon the maximum number of pulses to be counted.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the apparatus and structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

This invention having been described, what is claimed is:

1. An electronic coin totalizer for use in controlling a coin-operated machine comprising, in combination, means for receiving coins of different denominations, means responsive to the receipt of said coins for generating electrical pulses corresponding in number to the denomination of the coins received, a decade counter coupled to said pulse generating means to count the number of pulses generated by the deposit of coins, said counter having a plurality of stages and producing a signal indicative of the counter having reached a total count of *n* pulses, machine control means responsive to said signal, and reset means coupled to said stages to reset the counter to a condition requiring it to count a predetermined number of pulses less than *n* in order to indicate said total count of *n* pulses.

2. The totalizer of claim 1 wherein said reset means includes means for selectively conditioning each of said stages in one of two modes whereby said predetermined number of pulses to be counted can be varied.

3. An electronic coin totalizer for use in controlling a coin-operated machine comprising, in combination, means for receiving coins of different denominations and generating electrical pulses corresponding in number to the denomination of the coins received, a decade counter coupled to said pulse generating means to count the number of pulses generated by the deposit of coins, said counter including a plurality of binary stages each having two modes with the last stage producing a signal indicative of the counter having reached a total count of *n* pulses, machine control means responsive to said signal, and multiposition switch means connected to the respective ones of said binary stages to reset the counter responsive to a biasing voltage being applied to the switch means, said switch means being so connected to the binary stages that the biasing voltage will condition each binary stage in one or the other of its two modes in accordance with the setting of the switch means to thereby determine the number of pulses the counter must count before the last stage emits said signal.

4. The totalizer of claim 3 wherein a multiposition switch is provided for each binary stage with the switches having their contacts connected to the respective binary stages in binary decade sequence.

5. An electronic coin totalizer for use in controlling a coin-operated machine, comprising, in combination, means for receiving coins of different denominations, means responsive to the receipt of said coins for generating electrical pulses corresponding in number to the denomination of the coins received, a decade counter coupled to said pulse generating means to count the number of generated pulses and having a plurality of binary stages and a total counting capacity of *n* pulses, machine control

means coupled to the counter to be energized responsive to the counter indicating a total count of n pulses, and reset means coupled to at least some of said binary stages to condition them so that less than n generated pulses are required to cause the counter to indicate said total count of n pulses.

6. An electronic coin totalizer for use in controlling a coin-operated machine comprising, in combination, means for receiving coins of different denominations and generating electrical pulses corresponding in number to the denomination of the coins received; a decade counter coupled to said pulse generating means to count the number of pulses generated by the deposit of coins, said counter having a plurality of binary stages each having two modes and each adapted to be conditioned to be in one or the other of said modes by the application of a biasing voltage thereto so that by selectively applying said biasing voltages to the various binary stages, the counter can be preset to count a predetermined number of pulses less than its total capacity, the last stage of the counter producing a signal indicative of the counter having reached a total count of n pulses; machine control means responsive to said signal; and switch means connected to the respective ones of said binary stages to selectively apply said biasing voltage thereto to preset the counter to a condition that a predetermined number of pulses less than n in number is required to cause the counter to produce said signal and by actuating the switch means, to change said predetermined number of pulses.

7. The totalizer of claim 6 wherein said switch means includes a plurality of multiposition switches with the switches having their contacts connected to the binary stages in binary decade sequence.

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ROBERT B. REEVES, *Primary Examiner.*

STANLEY H. TOLLBERG, *Examiner.*