United States Patent

[11] 3,608,689

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[45] Patented **Sept. 28, 1971**
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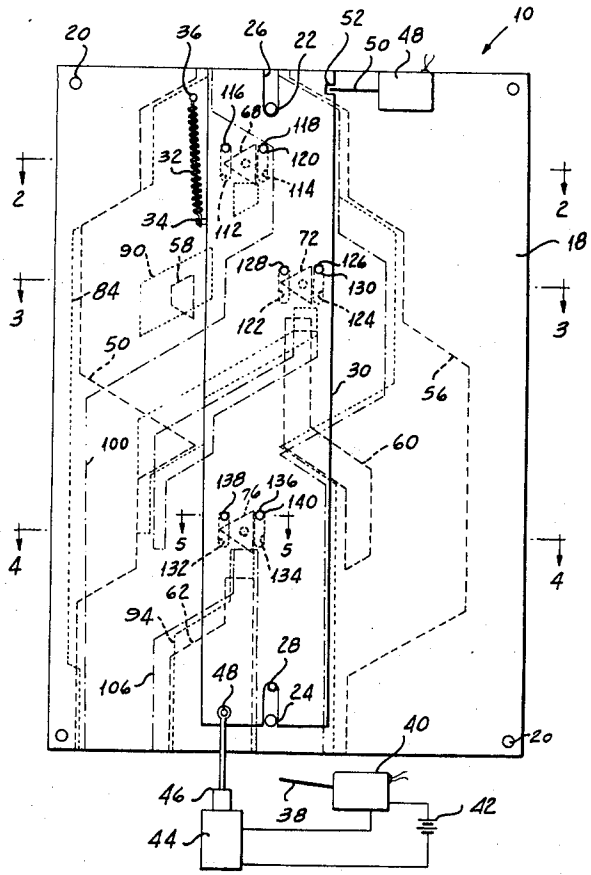
[54] **BINARY COIN TOTALIZER**
14 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **194/1,** 194/9
[51] **Int. Cl.** **G07f 1/00**
[50] **Field of Search** 194/.01, 1, 9, 10

[56] **References Cited**
FOREIGN PATENTS
570,194 2/1933 Germany 194/.01

Primary Examiner—Samuel F. Coleman
Attorney—Shenier & O'Connor

ABSTRACT: A binary coin totalizer in which a plurality of guide plates are mounted in side-by-side relationship to form branched paths for coins of different denominations. Coin diverters selectively common to branches of the various paths alternatively divert successive coins passing thereby to different branches ultimately to direct all coins saving the last making up the total for which the device is set to a first opening and to direct the last coin out of a second opening to indicate that the total has been deposited in the totalizer.

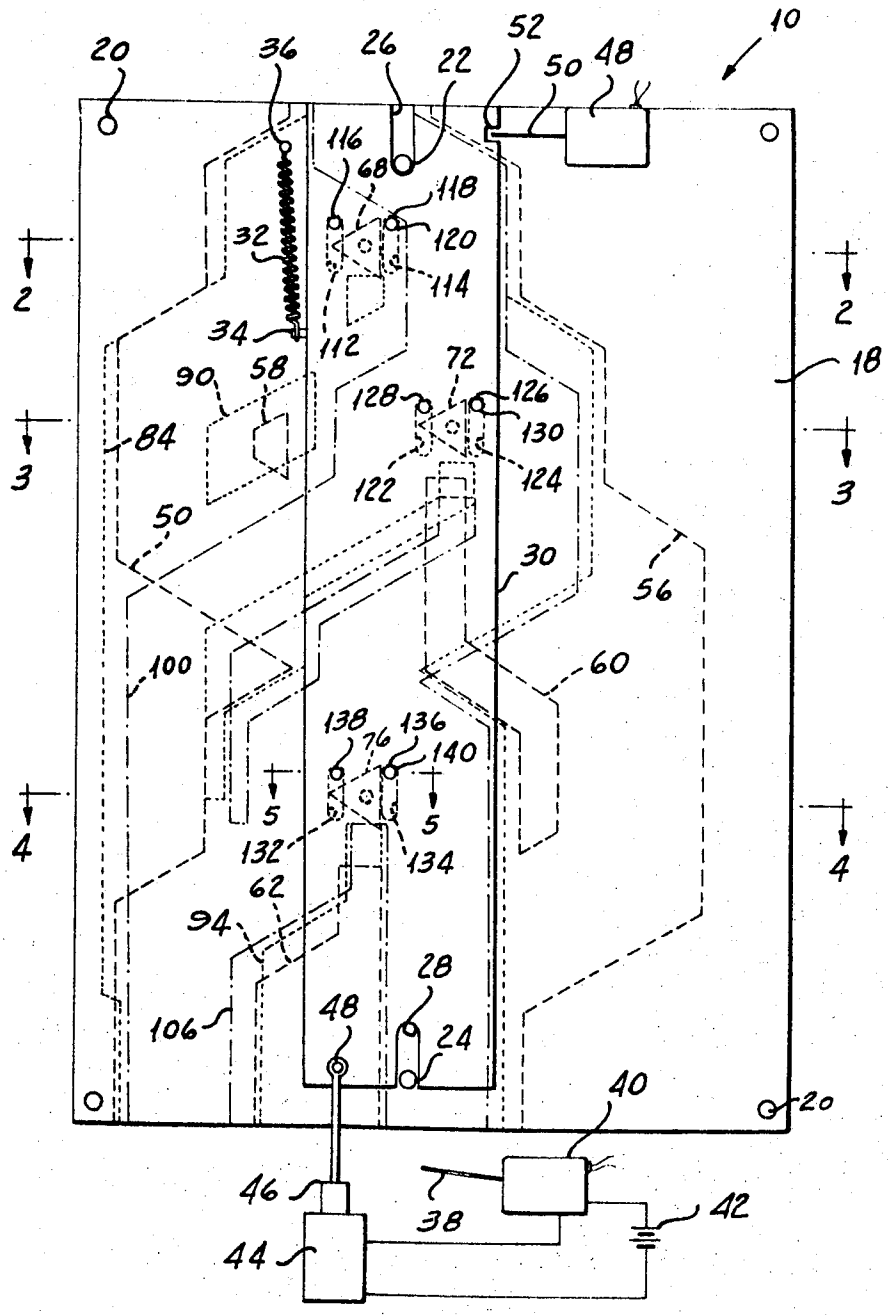


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SHEET 1 OF 3

Fig 1



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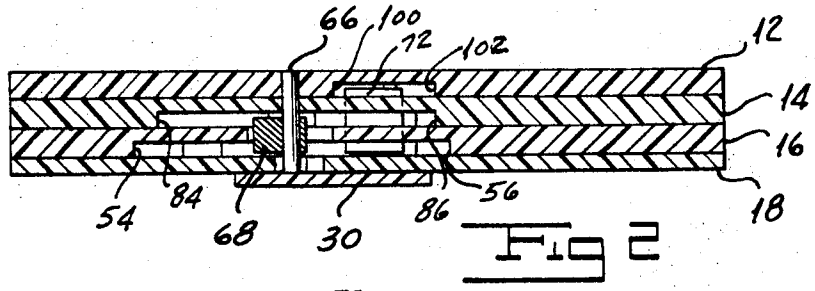


Fig 2

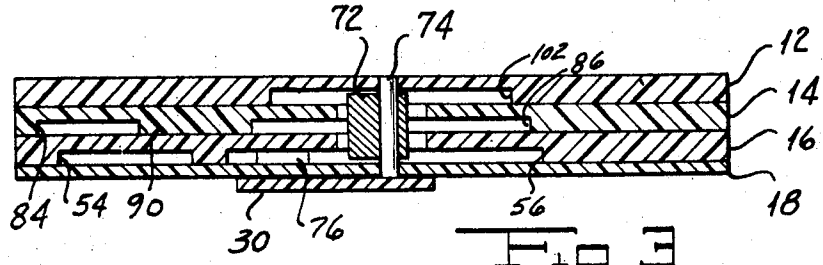


Fig 3

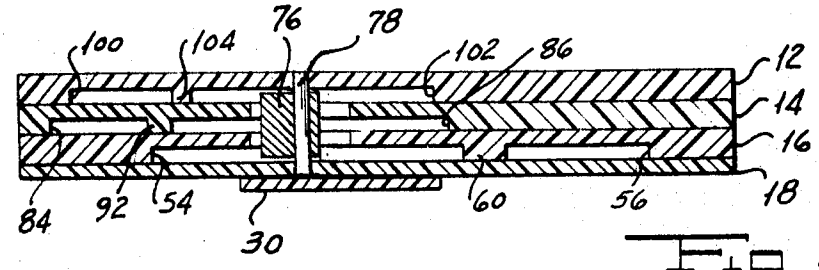


Fig 4

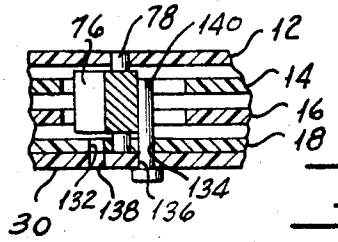


Fig 5

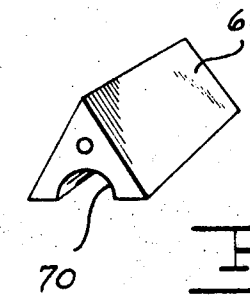


Fig 6

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Fig 7

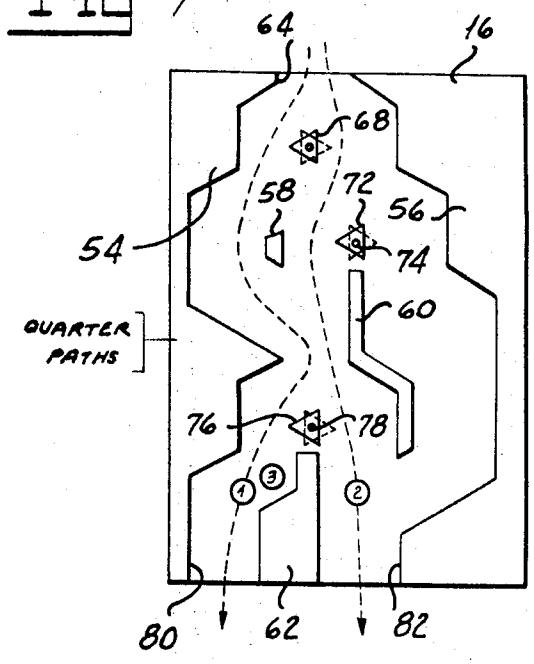
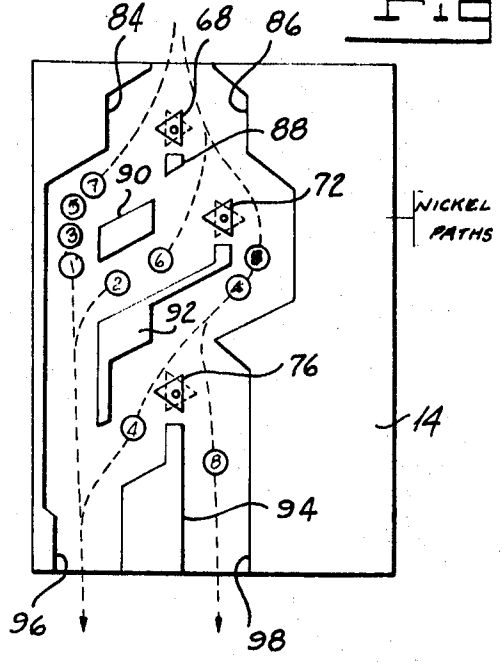


Fig 8



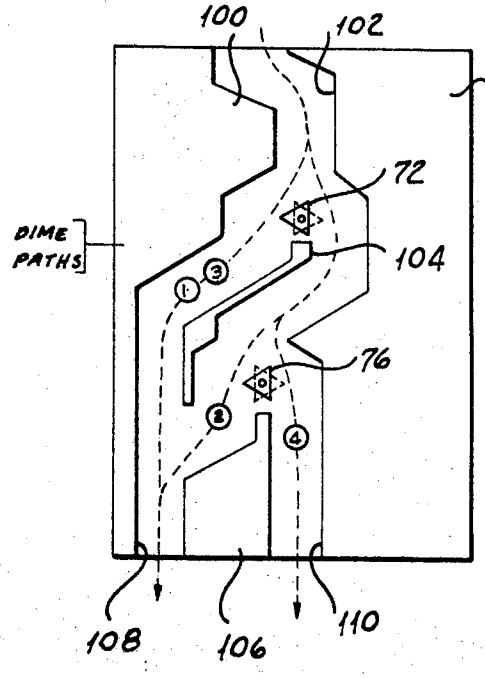


Fig 9

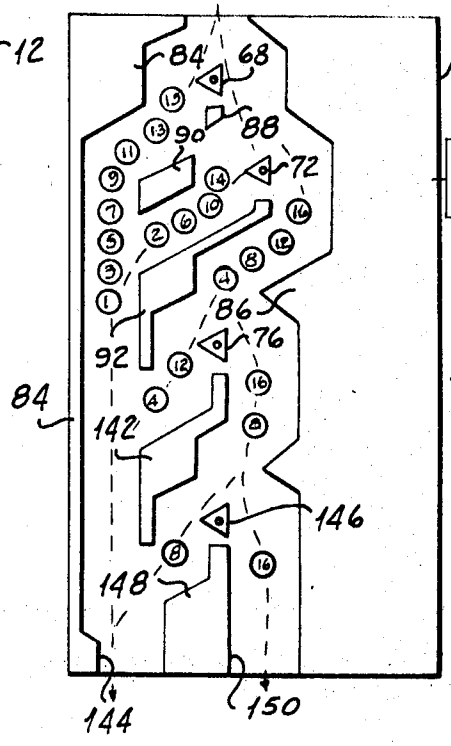


Fig 10

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BINARY COIN TOTALIZER

BACKGROUND OF THE INVENTION

Various forms of coin totalizers are known in the prior art for providing a signal or for releasing a normally locked mechanism when coins aggregating a certain sum have passed therethrough. Most of the coin totalizers known in the prior art are relatively complicated mechanisms in which coins of the various denominations actuate respective feelers which in turn are arranged to provide an aggregate movement of a driven member which is the analog of the sum in coins passing through the totalizer. Owing to the complicated nature of these devices, they are relatively difficult to construct and consequently, are expensive. They are, moreover, subject to mechanical failure and a resultant disabling of the machine with which they are used. These coin mechanisms are provided with relatively complex arrangements for changing the price at which a signal is given to indicate that a sum equal to the price has passed through the totalizer.

I have invented a binary coin totalizer which overcomes the disadvantages of coin totalizers of the prior art. It is extremely simple in that it incorporates very few moving parts. It is inexpensive to construct. The price for which a machine including my totalizer will vend can be changed in a simple and expeditious manner. My totalizer is flexible in that it can easily be arranged to totalize any sum in coins. My totalizer is not limited to use with coins of a certain currency.

SUMMARY OF THE INVENTION

One object of my invention is to provide a binary coin totalizer which overcomes the defects of coin totalizers of the prior art.

Another object of my invention is to provide a binary coin totalizer which is extremely simple in that it incorporates a minimum of moving parts.

A further object of my invention is to provide a coin totalizer which is inexpensive to construct.

Yet another object of my invention is to provide a binary coin totalizer which enables a price change to be made in a rapid and expeditious manner.

Still another object of my invention is to provide a binary coin totalizer which is not limited to use with coins of a particular currency.

Other and further objects of my invention will appear from the following description.

In general, my invention contemplates the provision of a binary coin totalizer in which coin diverters selectively common to branches of coin paths for coins of respective denominations alternatively divert successive coins passing thereby to different branches ultimately to cause all coins save the last making up a sum corresponding to the total for which the device is set to be directed to one outlet and to cause the last coin to be directed to another outlet to indicate that the total has been passed through the device.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIG. 1 is a front elevation of one form of my binary coin totalizer.

FIG. 2 is a sectional view of the form of my totalizer shown in FIG. 1 taken along the line 2—2 of FIG. 1.

FIG. 3 is a sectional view of the form of my binary coin totalizer illustrated in FIG. 1 taken along the line 3—3 of FIG. 1.

FIG. 4 is a sectional view of the form of my binary coin totalizer illustrated in FIG. 1 taken along the line 4—4 of FIG. 1.

FIG. 5 is a fragmentary sectional view of the form of my binary coin totalizer illustrated in FIG. 1 taken along the line 5—5 of FIG. 1.

FIG. 6 is a perspective view illustrating one of the coin diverters of the form of my binary coin totalizer illustrated in FIG. 1.

FIG. 7 is an elevation illustrating the quarter coin path of the form of my coin totalizer illustrated in FIG. 1.

FIG. 8 is an elevation of the nickel coin track of the form of my invention illustrated in FIG. 1.

FIG. 9 is an elevation of the dime track of the form of my totalizer illustrated in FIG. 1.

FIG. 10 is an elevation of the nickel coin track of an expanded form of my binary coin totalizer.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 to 5, the form of my binary coin totalizer, indicated generally by the reference character 10 illustrated therein, includes a dime guide plate 12, a nickel guide plate 14, a quarter guide plate 16, and a cover plate 18 held in assembled relationship by any suitable means such, for example, as by screws 20. Respective pins 22 and 24 riding in slots 26 and 28 support a reset bar 30 for vertical sliding movement on the plate 18 between upper and lower limit positions. Any suitable means, such for example as a spring 32 extending between a pin 34 on bar 30 and another pin 36 on plate 18, normally urges the bar 30 to its upper limit position.

As will be explained more fully hereinafter, the last coin making up the total for which the totalizer 10 is set strikes a switch actuating arm 38 to close a normally open switch 40 to connect a source 42 of potential to a solenoid 44 having an armature 46 connected to a pin 48 on bar 30. When solenoid 44 is energized, it pulls pin 38 downwardly to its lower limit position to reset the totalizer 10 in a manner to be described. I may provide a switch 48 having an arm 50 disposed in a slot 52 in bar 30 to energize a vending means (not shown). When a sum has been totaled the bar 30 moves downwardly. This downward motion may release a normally locked vending means (not shown).

Referring now to FIGS. 1 to 4 and 7, plate 16 is provided with a plurality of guides 54, 56, 58, 60 and 62 which form the various quarter branch paths. The upper ends of guides 54 and 56 form a mouth 64 into which quarters are fed by a coin separator and slug rejector mechanism of any suitable type known to the art. A shaft 66 carried by plates 12 and 18 carries a coin diverter 68 for pivotal movement in the path of a quarter entering the mouth 64. As can be seen by reference to FIG. 6, the coin diverter 68 is of generally triangular cross-sectional shape having a cutout 70 in the bottom thereof. Shaft 68 extends through the center of the triangular cross-sectional shape. As will be explained more fully hereinafter, when the totalizer 10 has been reset, diverter 68 is oriented with its apex directed to the right. The first quarter entering the mouth of the quarter coin track is directed by diverter 68 along a path branch between guide 54 and the guide 58. In the course of that movement, the quarter moves the diverter 68 to the broken line position where its apex is directed to the left. The second quarter entering the quarter coin track strikes diverter 68 so as to pass to the right thereof and fall downwardly toward a second diverter 72 carried by a shaft 74 supported in plates 12 and 18. This diverter likewise initially is oriented with its apex to the right so as to cause the first coin striking the diverter to pass to the left between the diverter and guide 58.

A third diverter 76 carried by a shaft 78 supported in plates 12 and 18 normally is oriented with its apex to the right. Returning to the first quarter entering mouth 64 as it emerges from the path between guides 54 and 58, it falls downwardly toward diverter 76, which causes the first quarter to pass to the left of the diverter to an outlet opening 80. A second quarter is directed to the right of diverter 68 and falls downwardly toward diverter 72 which is oriented to the right to cause the second quarter to pass to the left thereof. Now after the second quarter leaves diverter 72, it moves downwardly toward diverter 76, which has been positioned

with its apex to the left by the first quarter. As a result, the second quarter is caused to pass to the right of diverter **76** to an outlet opening **82**.

A third quarter passing through the quarter track travels the same path as does the first quarter. A fourth quarter will travel along a path between guide **60** and guide **56** to be discharged through the opening **82** as was the second quarter. As will be apparent from the description hereinafter, the fourth quarter path and the third quarter path are of interest where more than the number of diverters shown in FIG. **1** are employed to increase the capacity of the totalizer.

Referring now to FIGS. **1** to **4** and **8**, the plate **14** forming the nickel track is provided with a plurality of guides **84**, **86**, **88**, **90**, **92** and **94**. All of the diverters **68**, **72**, and **78** are common to the nickel guide track and the quarter guide track. Considering all of the diverters to have been reset so as to be oriented with their apices to the right and assuming that only nickels are being deposited in the totalizer **10**, the first nickel and every alternate succeeding nickel are directed by diverter **68** to a path branch between guides **84** and **90** so as to pass directly out through an opening **96**. All even-numbered nickels are directed by diverter **68** to the space between guides **86** and **88** toward diverter **72** so that the first even-numbered nickel and alternatively successive even-numbered nickels are directed to the path branch between guides **90** and **92** which directs them out through the outlet opening **96**. The remaining even-numbered nickels move into the space between guides **86** and **92** which directs them toward the third diverter **78**. Alternate ones of these last-named nickels are directed to the path branch between guides **92** and **94** leading to outlet **96** and to the path branch between guides **86** and **94** leading to an outlet opening **98**.

To summarize, the passage of nickels through the totalizer, all odd nickels are directed between guides **84** and **90** directly to the opening **96**. The second and sixth nickels are directed between guides **90** and **92** and then to opening **96**. The fourth nickel is directed to the path branch formed between guides **92** and **94** to outlet **96**, while the eighth nickel is directed to the path branch formed by guides **86** and **94** and thence to outlet opening **98**. Thus, diverter **68** divides the total number of coins deposited by two; diverter **72** divides the total number of coins deposited by four, while diverter **78** divides the total number of coins deposited by eight. The logic of my system will readily be apparent. It operates in the manner of a natural binary system in separating one coin from a plurality deposited therein thus to indicate a total. This is achieved by successively dividing the total number of coins deposited by two as they progress through my register.

Referring to FIGS. **1** to **4** and **9**, plate **12** carries respective guides **100**, **102**, **104** and **106**. Only the diverters **72** and **76** are common to all three paths. The first and third dimes deposited in the totalizer are directed by diverter **72** to the space between guides **100** and **104** from whence they pass directly to an outlet opening **108**. Even-numbered dimes are directed by diverter **72** to the branch between guides **102** and **104** which lead to the diverter **76**. The first of these even-numbered dimes, which is the second dime deposited, is directed by diverter **76** to the branch between guides **104** and **106** to pass to the opening **108**. Diverter **76** directs the second even-numbered dime or the fourth dime deposited to an outlet opening **110**.

From the foregoing, it will further be appreciated that actuation of the respective diverters **68**, **72** and **76** corresponds to a deposit of a particular sum. Actuation of diverter **68** corresponds to a nickel; actuation of diverter **72** corresponds to a dime, while actuation of diverter **76** corresponds to 20 cents.

As has been pointed out hereinabove, when solenoid **44** is energized, it pulls bar **30** downwardly against the action of spring **32** to reset the sensors **68**, **72** and **76**. I provide the plate **18** with a pair of slots **112** and **114** adjacent sensor **68**. The reset bar **30** has respective holes **116** and **118** aligned with slots **112** and **114**. Normally, I position a reset pin **120** in hole **118** so that it extends through slot **114** to a position adjacent the sensor **68**. Assuming that the sensor **68** has been actuated so that the end of a totalizing operation it is oriented with its apex to the left as viewed in FIG. **1**, when bar **30** is operated, pin **120** actuates the sensor to reset it with its apex oriented to the right.

I provide plate **18** with another pair of slots **122** and **124** adjacent sensor **72**. A hole **126** of a pair of holes **126** and **128** aligned with slots **122** and **124** normally receives a pin **130** for resetting sensor **72** in a manner similar to that in which pin **120** resets sensor **68**. I provide plate **18** with a third set of slots **132** and **134** adjacent sensor **76**. One hole **136** of a pair of holes **136** and **138** normally receives a pin **140** which resets the sensor **76** in a similar manner.

The resetting arrangement just described enables me to change the sum totalized by the device **10**, which is the price at which an article is sold in a simple and expeditious manner. For example, I may remove pin **120** from hole **18** and insert it in hole **116** to subtract a nickel from the maximum of 40 cents for which the totalizer **10** normally is set. This will readily be appreciated by considering that upon a resetting operation with pin **120** so positioned, the sensor **68** will initially be in the same position which it occupies after a nickel has passed through the totalizer. That is to say, shifting the pin in effect registers a nickel credit before any coins are deposited. In a similar manner, pins **130** and **140** may be removed respectively to subtract 10 cents and to subtract 20 cents from the maximum price.

Referring now to FIG. **10**, I have illustrated a nickel coin track plate which is expanded so as to total the maximum of 80 cents rather than 40 cents, for example. In this form of my device, I replace the output guide **94** of the nickel coin track with a guide **142** forming with guide **84** a fourth branch leading to an outlet **144**. Another fourth branch formed by guide **142** and guide **86** directs nickels to still another sensor **146** which alternately directs successive coins to a branch formed between guide **142** and guide **148** or to a branch formed between guide **148** and guide **86**. Coins directed into the branch between guides **142** and **148** pass out through an opening **150**. The manner in which the modified guide plate **14** cooperates with other plates of an expanded totalizer will readily be apparent from the discussion hereinabove in connection with the form of my totalizer illustrated in FIG. **1**. By way of example, assuming that only nickels pass to the totalizer the first and all alternate successive nickels pass directly to outlet **144**; all even-numbered nickels go to deliver **72**. The second, sixth, 10th and 14th nickels are directed by diverter **72** to outlet **144**. The fourth, eighth, 12th and 16th nickels are directed by diverter **72** to another diverter **76**. This diverter **76** directs the fourth and 12th nickels to outlet **44** and the eighth and 16th nickels to a further diverter **146**. This last diverter directs the eighth nickel to outlet **144** and the 16th nickel to outlet **150**. Thus only the 16th nickel corresponding to 80 cents comes out of outlet **150** thus to indicate that 80 cents has passed through the totalizer **10**.

The operation of my totalizer in summing coins all of the same denomination will readily be apparent from the description hereinabove. Considering quarters, the first and third pass out of outlet **80**, while the second and fourth pass out of outlet **82**. Where only 40 cents is being totalized, the second quarter comes out to operate arm **38**. It will readily be appreciated that the first coin emerging to the location of arm **38** might be used to complete a mechanical linkage rather than to operate a switch, if desired. Considering nickels, the first, third, fifth and seventh are all passed directly to outlet **96** by diverter **68**. The even-numbered nickels are directed to diverter **72** which passes the second and sixth to outlet **96** and which diverts the fourth and eighth to diverter **76**. Diverter **76** passes the fourth nickel to outlet **96** and the eighth nickel to outlet **98**.

Considering dimes, odd-numbered dimes are directed by diverter **72** directly to outlet **108** and even-numbered dimes are directed to diverter **76**. Diverter **76**, in turn, directs the second dime to outlet **108** and the fourth dime to outlet **110**.

As will further be appreciated from the structure outlined above, actuation of diverter **68** by a nickel changes its position in the quarter path as well as vice versa. The other diverters **72** and **76** similarly are operated by coins of all three denominations. My arrangement is such that the totalizer passes the last coin making up the maximum for which the totalizer is set to one of the outlets **82, 98** and **110** to actuate arm **138** no matter what denominations make up the sum and no matter in what order the coins are inserted in the totalizer. For purposes of simplicity, I have outlined below in table I the orientations of the various diverters as different combinations of coins are inserted therein.

TABLE I

Amount totalized	Nickels only	Dimes only	One quarter	QDN	DQN	NDQ	NDNDD
0							
5¢	1N					N	1N
10¢	2N	1D			D		
15¢	3N					D	1D
20¢	4N	2D					2N
25¢	5N		Q	Q			
30¢	6N	3D					2D
35¢	7N			D	Q		
40¢	8N	4D		N	K	Q	3D

An expanded totalizer, the nickel guide plate **14**, which is shown in FIG. **10**, similarly will operate to totalize 80 cents no matter what coins go to make up the total sum and no matter in what order they are deposited. One example of this operation is illustrated in table II below:

TABLE II

Coin deposit ⟶	0 ⟶	1Q →	2Q →	1D →	2D →	3D
Amount totalized ⟶	0 ⟶	25 ⟶	50 ⟶	60 ⟶	70 ⟶	80

As the last coin making up the total emerges from totalizer **10**, it strikes arm **38** to energize solenoid **44** to reset all of the diverters. Switch **48** registers that operation. If for any reason it is desired to subtract from the maximum amount to be totaled, the pins **120, 130** and **140** can be shifted to subtract respectively 5 cents, 10 cents and 20 cents from the maximum price. Thus, with the form of my totalizer illustrated in FIG. **1**, any amount from 5 cents to 40 cents can be made to operate arm **38**. Further, by proper shaping of the various guides, my totalizer can be made to accommodate coins of any currency.

For purposes of clarity each of the guide plates **12, 14** and **16** can be considered to form a coin path made up of a plurality of possible branches as determined by the various diverters. For example, considering the nickel guide plate **14**, diverter **68** divides the entry path into a first branch leading to outlet **96** and a second branch leading to diverter **72**. Diverter **72** divides the second branch into a third branch running into the first branch and a fourth branch leading to diverter **76**. Diverter **76** divides the fourth branch into a fifth branch which leads into the first branch and a sixth branch leading to outlet **98**. The other guide plate path branches can be identified in an analogous manner.

It will be seen that I have accomplished the objects of my invention. I have provided a binary coin totalizer which is extremely simple in construction and in operation. It is inexpensive to manufacture. It handles all coins of any currency. The maximum sum totalized can be figured in a rapid and expeditious manner.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. It is further obvious that various changes may be made in details without departing from the spirit of my invention. It is, therefore, to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. Apparatus for totalizing coins of various denominations aggregating a certain sum including in combination, means forming respective inlets for coins of various denominations, first outlet forming means for discharging coins of the various denominations to a first location, second outlet forming means for discharging coins of the various denominations to a second location spaced from the first location, and means disposed between said inlets and said outlets for directing the last coin passing through any one of said inlets to make up said sum to said second outlet-forming means and for directing all coins passing through said inlets before said last coin to the first outlet-forming means, said directing means comprising first means forming a first compound coin path for coins of a first denomination, said first coin path leading from a first one of said inlets and having first and second branches emanating from first location, second means forming a second compound coin path for coins of a second denomination, said second path leading from a second one of said inlets and having first and second branches emanating from a second location, said first and second paths being in spaced planes with said locations in registry and means common to said first and second locations for diverting successive coins entering said paths alternatively to first and second branches of said paths.

2. Apparatus as in claim **1** in which said directing means comprises third means forming a third compound coin path for coins of a third denomination, said third coin path leading from a third one of said inlets and having first and second branches, the second branches of each of said first and second

paths having third and fourth branches and means common to the third path and the second branches of the first and second paths for diverting successive coins entering any one of the third path or second branches of the first and second paths alternately to a path portion provided by one of the third path first branch and first and second path third branches or to a path portion provided by one of the third path second branch and first and second path fourth branches.

3. Apparatus as in claim 2 in which the first and third branches of the first coin path provide a common path portion, said first path comprising fifth and sixth branches leading from said common path portion, said second path comprising fifth and sixth branches leading from the fourth branch of the second path, said third path comprising third and fourth branches leading from the second branch of the third path, said directing means comprising means common to said common path portion and to said second path fourth branch and to said third path second branch for diverting successive coins entering any one of said common path portion and second path fourth branch and said third path second branch alternately to a path portion provided by one of the first and second path fifth branches and third path third branch or to a path portion provided by one of the first and second sixth branches and third path fourth branch.

4. Apparatus as in claim 3 in which each of said first and second and third path first branches and said second and third path third branches and second path fifth branches lead to said first outlet-forming means and in which each of said first and second path sixth branches and said third path fourth branch lead to said second outlet-forming means.

5. Apparatus as in claim 2 in which each of said directing means comprises a wedge-shaped diverter and means pivotally mounting each diverter for movement between a first position at which it directs coins to one of its associated paths and a second position at which it directs coins to the other of its associated branches.

6. Apparatus as in claim 5 including reset means for initially orienting said diverters to one of said positions.

7. Apparatus as in claim 6 in which said reset means comprises means for changing the initial orientation of any one of said diverters.

8. Apparatus as in claim 6 in which said reset means is responsive to said last coin emerging from said second outlet-forming means.

9. Apparatus as in claim 6 in which each of said diverters has an apex and a base provided with a cutout portion.

10. Apparatus as in claim 6 in which said reset means comprises a bar and pins carried by said bar at location adjacent said diverters.

11. Apparatus for totalizing a certain sum in coins of a first denomination and of a second denomination which is an even multiple of said first denomination and of a third denomination which is an odd multiple of the first denomination including in combination, means forming respective inlets for coins of said denominations, means forming first and second coin outlets, means forming respective compound paths for said coins leading from said inlets to said outlets and coin-responsive means located along said paths for directing the last coin passing through said inlet forming means to make up said sum to said second outlet and for directing all coins passing through said inlet before said last coin to the first outlet.

12. Apparatus as in claim 11 in which said paths are in spaced planes and in which said coin-responsive means comprises an actuatable diverter common to two of said paths.

13. Apparatus as in claim 11 in which said paths are in spaced planes with first points in said first and third denomination paths in registry and with second points in said first and second denomination paths in registry and with third points in said first and second and third denomination paths in registry, said coin-responsive means comprising a first actuatable diverter common to said first points and a second actuatable diverter common to said second points and a third actuatable diverter common to said third points.

14. Apparatus as in claim 13 in which said first denomination path is sandwiched between said second and third denomination paths.

PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,608,689 **Dated** September 28, 1971

Inventor(s) William Rosenhagen

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 7, line 23:
After "second" insert --path--.

Signed and sealed this 7th day of March 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents