

July 15, 1952

C. V. RICHEY

2,603,333

COIN COLLECTION AND REGISTERING APPARATUS

Filed June 19, 1947

4 Sheets-Sheet 1

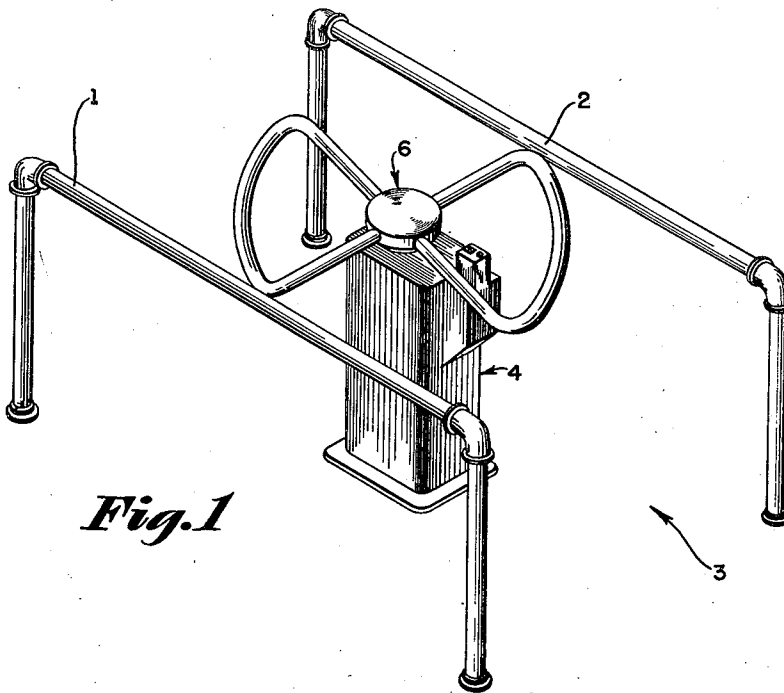


Fig. 1

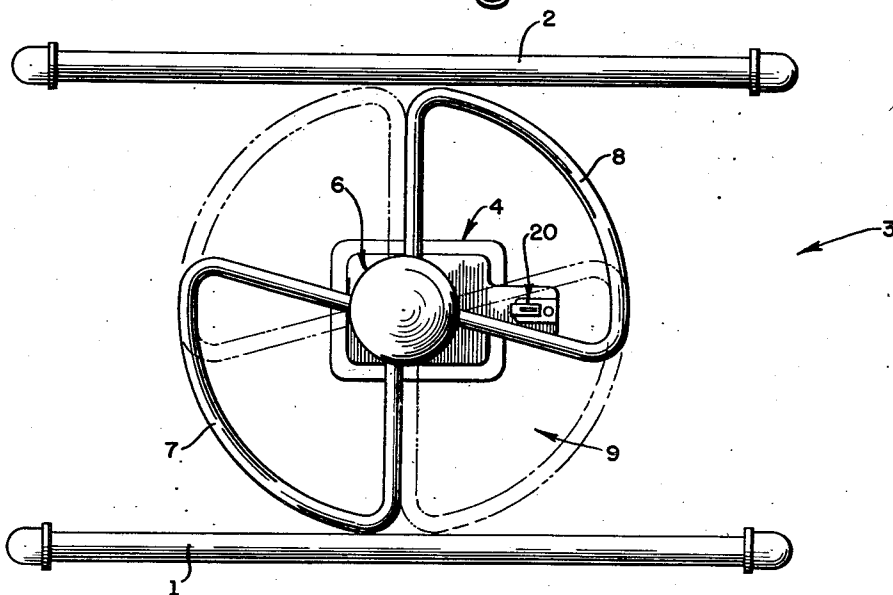


Fig. 2

INVENTOR.
CHARLES V. RICHEY

BY

Man, Fenwick & Lawrence
ATTORNEYS

July 15, 1952

C. V. RICHEY

2,603,333

COIN COLLECTION AND REGISTERING APPARATUS

Filed June 19, 1947

4 Sheets-Sheet 2

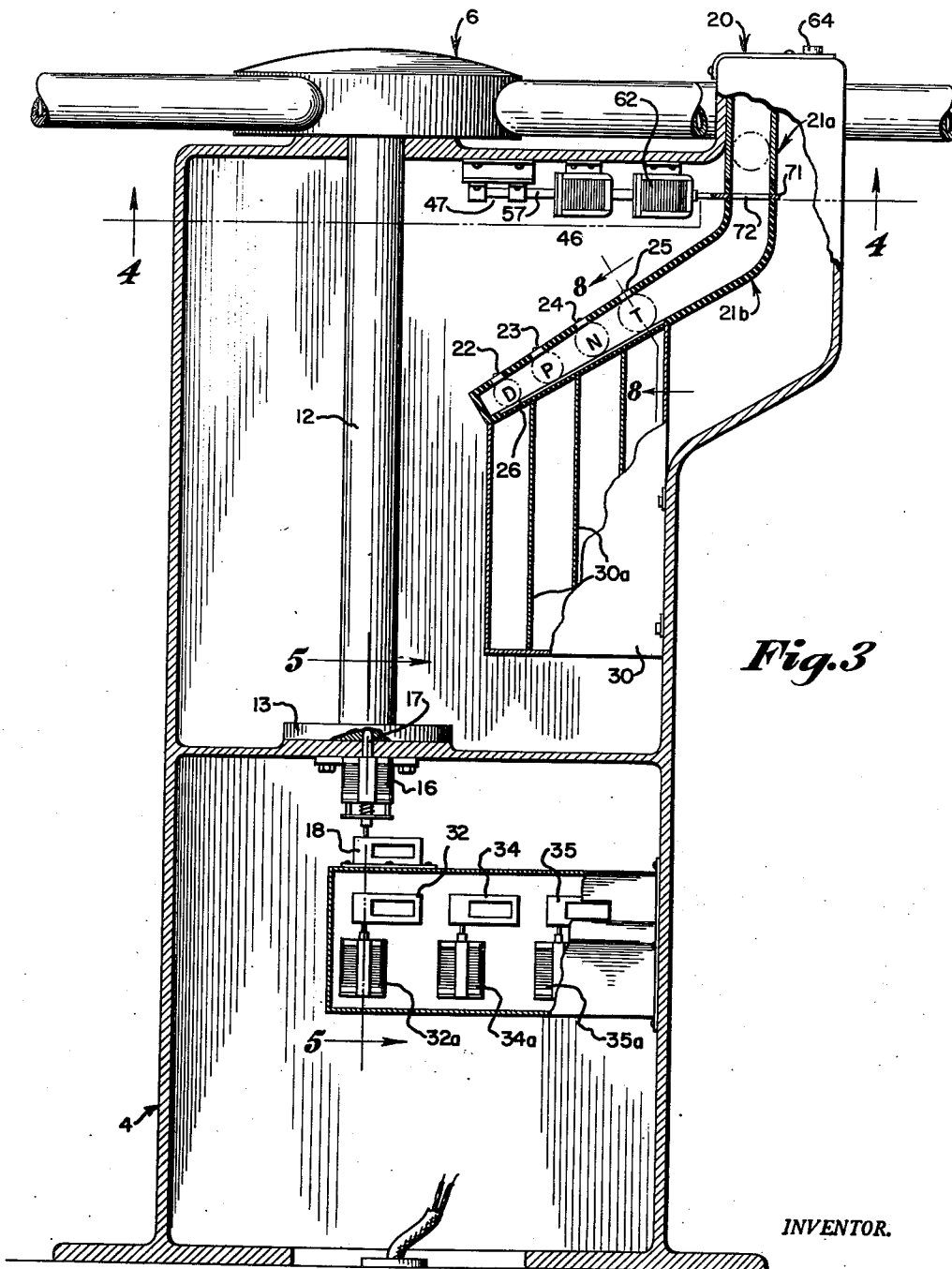


Fig.3

INVENTOR.

BY CHARLES V. RICHEY

Mason, Fennell & Lawrence
ATTORNEYS

July 15, 1952

C. V. RICHEY

2,603,333

COIN COLLECTION AND REGISTERING APPARATUS

Filed June 19, 1947

4 Sheets-Sheet 3

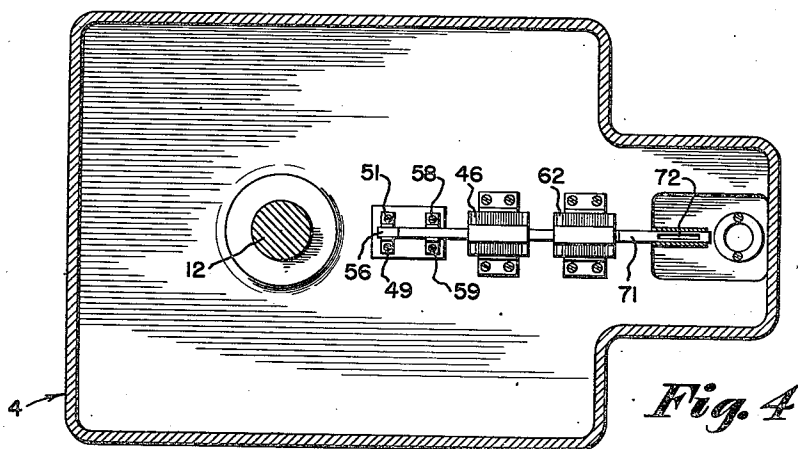


Fig. 4

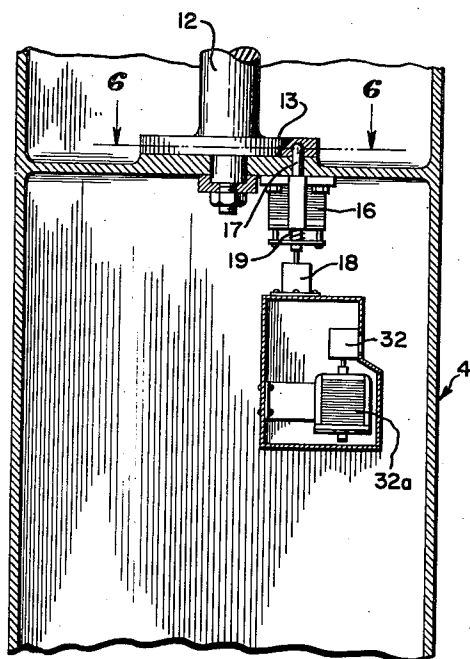


Fig. 5

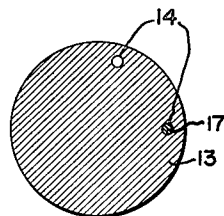


Fig. 6

INVENTOR.
CHARLES V. RICHEY

BY

Mason, Fenwick & Lawrence
ATTORNEYS

July 15, 1952

C. V. RICHEY

2,603,333

COIN COLLECTION AND REGISTERING APPARATUS

Filed June 19, 1947

4 Sheets-Sheet 4

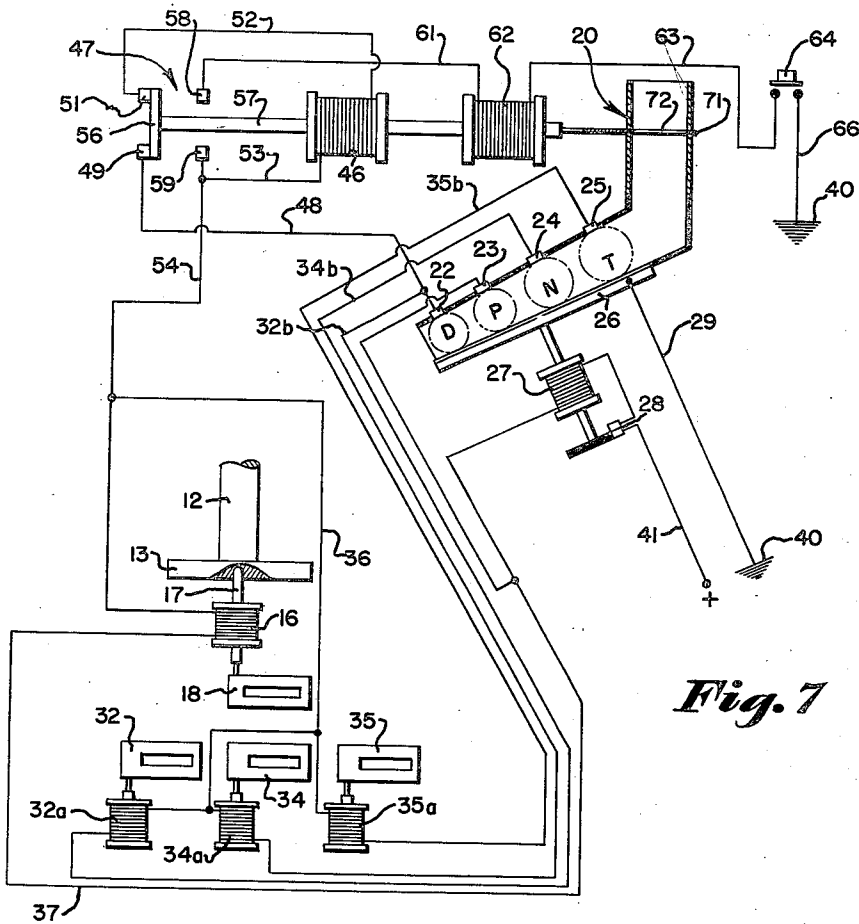


Fig. 7

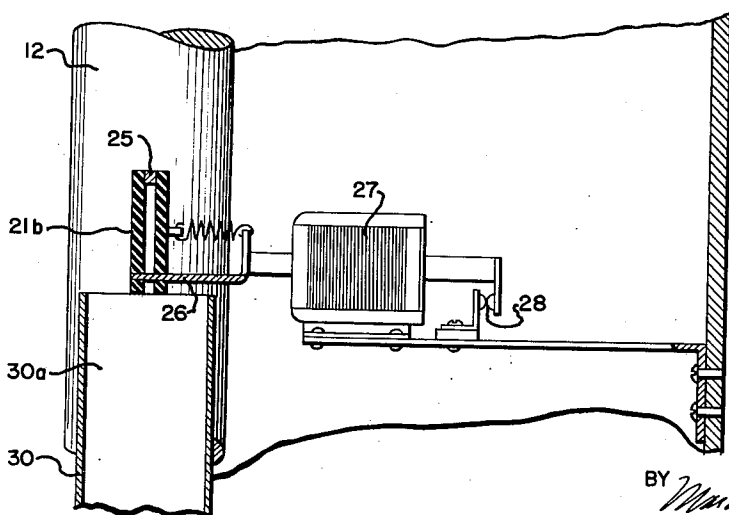


Fig. 8

INVENTOR
CHARLES V. RICHEY

BY *Marion Lewis Lawrence*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,603,333

COIN COLLECTION AND REGISTERING APPARATUS

Charles V. Richey, Jamaica, N. Y.

Application June 19, 1947, Serial No. 755,613

3 Claims. (Cl. 194-6)

1

This invention relates to coin collecting apparatus for collecting coins deposited for the use of a facility or service and particularly for use at the entrance to stations for subway, elevated, or other transportation systems, street cars, buses, ferries, amusement places and the like. The invention may also be used to register the number of coins collected and the total amount of money and/or the persons who pass through the entrance passageway. The present invention as described and illustrated is shown as applied to apparatus for the collection of fares in the operation of transportation systems, but it is to be understood that the invention is not limited in this respect and is equally well adapted for use as indicated above.

In the operation of transportation systems, experience has indicated that great loss of revenue is sustained because of the failure to collect the proper fare for each passenger carried. It is common knowledge that street car, bus and subway railway systems must be adapted to handling peak loads of traffic during "rush hours." At these times the crowds are abnormally large and all of the passengers are usually anxious to get through the entrance gates and board the trains in the least possible time. Automatic fare collecting apparatus has been resorted to because it eliminates the necessity of having a cashier to collect the fare or to sell tickets and also insures that the line of people passing through the entrance will move at a steady pace because there is no delay for each individual passenger who does not have the correct change at hand. In the case of the coin collecting apparatus, each person knows he must have the correct fare available before he gets into the line, it being common practice to have one cashier in the vicinity to make the necessary change required by the automatic coin collectors. However, even with the coin collecting apparatus now in current use, one of the serious disadvantages from the standpoint of the management of the system is that due to the fact that the coin collecting apparatus is available to the general public, there is an opportunity for persons so inclined to cause incorrect registration and to cause the apparatus to unlock the barriers and permit the passage of a person without the payment of the proper fare. Sometimes this may be done by two persons attempting to pass through the barrier upon the payment of one fare or by the use of slugs or coins to which strings have been attached.

The present invention is directed to improve

2

ments in coin collecting and registering apparatus in which a special oscillating barrier which serves the function of a turnstile is used to control the entrance to a facility, such as a railway station. The oscillating barrier is so arranged in the entrance passage to the station that when the proper fare is deposited the barrier is unlocked and the person may push the barrier aside to continue into the station.

The special shuttlestile barrier is arranged in the center of a passageway which is wide enough to accommodate two lines of passengers. The shuttlestile of generally duofoil shape, is pivoted at its center at a point midway between the sides of the passageway in such a manner that passengers may be admitted alternately first from one line of passengers and then the other. Pivotal movement of the shuttlestile by a passenger in one line places the shuttlestile in such a position and conditions the controls so that the shuttlestile may be operated alternately by a passenger in the adjacent line.

Provision is also made for the operation of the shuttlestile to admit successively two passengers, one from one line and another from the opposite line, upon the deposition of a single coin representing two fares. The shuttlestile is adapted to close completely the entrance passageway in each of two alternate positions approximately ninety degrees apart, and as one passenger passes through one side of the passageway and turns the shuttlestile the pivotal movement of the latter to the second position closes the entrance passageway behind the passenger.

One of the improvements provided by this invention is the provision of circuit control means to prevent the breaking of the control circuit at the contacts which engage the coins. As the coins engage the contacts the control circuit is energized initiating the operation of the coin collecting and registering mechanism and also sets up a series of mechanical operations which open the control circuit before the coin passes from the contacts. This prevents sparking at the contacts and thereby eliminates the burning or carbonizing of the latter and greatly contributes to making the apparatus fool proof from an operating standpoint.

Another important feature of the invention is the provision of a coin collecting chute of such configuration that once the coin is deposited it is impossible for a person to retrieve it. For instance, if a person attaches a piece of string to a coin and drops it in the coin collecting mechanism the mechanical operations set up by the en-

energization of the control circuits open a door in the chute so that the coin falls into a position from which it cannot be retrieved. Furthermore, as distinguished from prior apparatus, the coin chute comprises a rather long vertical section which terminates in a sharp bend gooseneck section beyond which the coin contacts are located so that it is practically impossible for a person to place a wire or other conductor through the coin slot to energize the control circuit.

One of the primary objects of the invention is to provide an improved coin collecting mechanism which will be simple in structure and efficient in operation.

Another object is to provide a coin collection apparatus for operating a passageway control mechanism of the type described which enables efficient fare collection to be made as each person passes through the passageway.

Another object is to provide a coin collecting and registering apparatus in connection with a passageway control mechanism which embodies means to prevent the passage of persons through the passageway until the proper fares are deposited in the coin collecting apparatus which releases the shuttle barrier across the passageway.

Another object is to provide a passageway control mechanism including an oscillating type turnstile having means for locking it in two alternate positions and coin-controlled means for unlocking the turnstile.

Another object is to provide passageway control mechanism in which the payment of two fares by a single coin of the proper denomination will permit the unlocking of the barrier to permit the entrance of two persons in succession.

A still further object is to provide a coin collecting and registering mechanism in association with a passageway barrier mechanism in which the coin unlocks the barrier and causes the registration of the person upon the operation of the barrier as the person proceeds through the passageway.

A still further object is to provide an improved coin collecting apparatus for controlling a passageway barrier mechanism in which the control circuit is energized by the deposit of a coin but is de-energized at another point in the circuit before the coin passes from the coin contacts, thereby eliminating arcing, carbonizing and burning at the latter.

Other and further objects will become readily apparent from the following description when considered in connection with the accompanying drawings, illustrating an embodiment of the invention, and in which:

Figure 1 is a perspective view of passageway control mechanism made in accordance with the present invention;

Figure 2 is a plan view of Figure 1;

Figure 3 is a partial sectional elevation along line 3—3 of Figure 2;

Figure 4 is a horizontal section through the turnstile pedestal on line 4—4 of Figure 3 looking in the direction of the arrows;

Figure 5 is a partial sectional elevation on the line 5—5 of Figure 3;

Figure 6 is a partial horizontal sectional view on line 6—6 of Figure 5;

Figure 7 is a schematic wiring diagram of the coin-control passageway mechanism and register made in accordance with the present invention; and

Figure 8 is a partial section on line 8—8 of Figure 3.

In the drawings the invention is shown as applied to a mechanism for controlling the passageway through which passengers may enter to board railway trains and the like. Such a passageway may be formed by side rails 1 and 2 which define the restricted entrance 3. Located approximately midway between the two side rails 1 and 2 is a turnstile pedestal 4 to which an oscillating barrier turnstile 6 is pivoted for oscillatory movement about a vertical axis. The turnstile is adapted to be moved alternately from one position to the other for the purpose of alternately opening and closing the two aisles of the entrance which are formed by the turnstile pedestal and the two side rails.

The turnstile 6 comprises two pie-shaped sectors 7 and 8 the apexes of which are arranged adjacent each other in the hub of the turnstile 6 as clearly indicated in the drawings. The radius of the outside portions of the sectors 7 and 8 is substantially equal to the distance between the pivotal mounting of the turnstile and the side rails so that when the sectors are in the alternate positions shown first in the solid line position and then the dash-line position of Figure 2, both aisles of the entrance 3 are closed. The sectors 7 and 8 extend over an arc of more than 90 degrees so that when the turnstile is in the intermediate positions it would be substantially impossible for persons to pass the sectors on either side, thereby effectively blocking the entrance 3. Assuming that the passengers enter from the right as shown in Figures 1 and 2, it will be apparent that when the turnstile 6 is in the position shown in the solid-line that both aisles are completely closed. In utilizing the turnstile of the present invention, persons desiring to pass through the passageway will form in two lines determined by the aisles on the opposite sides of the pedestal 4. In the position shown, it will be apparent that there is a sectorial area 9 in the left-hand aisle which can accommodate a person in the standing position. Such person may unlock the turnstile by depositing his coin or token in the coin-collecting mechanism 20, the details of which will be more fully hereinafter explained. When the turnstile is unlocked the person in the sectorial area 9 may push on the side of the sector 7 rotating the turnstile to the position shown in the broken lines which permits his passage through the passageway and at the same time again closes the turnstile with the sectors 7 and 8 in the second alternate position shown in the broken lines. It will be readily apparent that the first person in the right-hand aisle will now enter the sectorial area in front of the sector 7 (in the broken-line position). This person may again unlock the turnstile by depositing the appropriate coin or token and rotate the turnstile to the original solid-line position. The electrical coin control mechanism will be described in detail hereinafter at which time a variation of the above will be described in which it is possible for a person in one aisle to deposit a coin of a denomination representing two fares which will permit his entrance in one side of the turnstile and the entrance of another person through the opposite aisle by the pressing of a button associated with the coin control mechanism.

The turnstile 6 is fixed to a shaft 12 which is suitably journaled in the turnstile pedestal 4 as shown in Figure 3. The lower end of the shaft

is provided with a suitably located plate 13 which may be integral with the shaft 12 or suitably fixed therewith in any suitable manner. As more clearly shown in Figure 6, the underside of the plate 13 is provided with cylindrical bores or recesses 14 which are positioned and spaced to correspond to the two alternate positions of the turnstile 6. An electro-magnetic actuating means 16 is provided with a locking pin 17 which is adapted to engage the recesses 14 in the underside of the plate 13. A suitable compression spring 19 is adapted to resiliently urge the locking pin against the lower side of the plate 13 so that the locking pin will engage the recesses 14 when they are in alignment with the pin. The pin may be withdrawn from the recesses 14, thereby unlocking the turnstile by energizing the electro-magnetic device 16 in a manner soon to be described. The armature of the electro-magnetic device to which the pin 17 is attached, is connected through a suitable linkage with a counter 18 of any suitable commercially available type for the purpose of registering the number of passengers passing through the turnstile. In this respect it will be understood that the locking pin 17 will be withdrawn to unlock the turnstile once for every fare which is deposited and registered on other mechanism which will be presently described.

The electro-magnetic device 16 is controlled by coin control and collecting means 20. One of the important features of the invention resides in the chute of the coin-collecting mechanism whereby it is substantially foolproof against tampering by unauthorized persons and in the manner in which the circuit for controlling the locking means and for operating the coin registering means is broken by a master control circuit breaker before the coins pass from the coin contacts where the circuit was established. The latter feature is particularly important because it avoids arcing and oxidizing of the coin contacts and thereby greatly reduces or eliminates their deterioration.

The coin collecting mechanism comprises a coin chute of substantial rectangular cross-section and having dimensions sufficient to accommodate the largest accessible coin or token and has a vertical portion 21a and a "gooseneck" portion 21b which is inclined with respect to the vertical portion. The opening at the upper end of the vertical portion 21a is slightly smaller than the inside dimensions of the latter so that any coin which might be forced in will not stick in this part of the chute. As will be apparent from Figure 3 the lower end of the gooseneck or inclined portion 21b tapers gradually so that different sized coins or tokens can be arrested at spaced contact points in the gooseneck portion. The vertical portion 21a may be made of any suitable material including conductors such as metal but preferably the portion 21a is made of an insulating material such as fiber or plastic in order to insulate a plurality of coin contacts 22, 23, 24 and 25 which are adapted to be engaged respectively by a dime D, penny P and nickel N or token T. The coins and tokens are indicated in broken lines merely to indicate their relative position at which they are arrested in the coin chute but it will be apparent that only one coin will engage its associated contact at any one time.

A common contact 26 in the form of a plate or door which closes the lower part of the coin chute under the coin. As illustrated in the drawings, this contact 26 is in the form of a slide plate which may be pulled transversely of the inclined

portion 21a of the coin chute by an electro-magnetic device 27 which also operates master circuit breaking contacts 28 which operate in a manner soon to be described. The invention is not limited to the exact type of door for releasing the coin and instead of having the contact 26 move sideways it will be apparent that it could be arranged on a hinge and swing away from the bottom of the inclined portion of the coin chute. The important thing is that the contact 26 can be moved to drop the coins or tokens away from their respective upper contact only after the electro-magnetic device 27 has opened the master circuit contacts 28. The contacts 28 are preferably of the conventional wiping contact type used in master circuit breakers.

From Figure 8 it will be noted that the plate 26 must move to the right by an amount equal to the width of the thickness of one side of the inclined portion of the chute plus the thickness of the coin before the latter can drop away from its respective upper contact. This motion is sufficient to permit the master contacts 28 to separate and break the control circuit before the coin can drop.

A suitable coin receptacle 30 is provided immediately below the respective contact positions of the different coins or tokens. This receptacle is provided with suitable partitions 30a which form individual chambers immediately below the respective coin positions so that all of the coins of one size or denomination are collected in the chamber immediately below it. It is readily apparent that the particular coin receptacle can be constructed in accordance with common practice since this item per se forms no part of the invention.

Referring to Figure 7, the schematic diagram showing the electrical circuits through which the coins or tokens control the locking mechanism for the turnstile and the registering mechanism for registering the number of passengers and the individual coins or tokens, is shown. It will readily appear that the circuits to all of the devices go through the contacts 28 of the master circuit breaker previously mentioned in connection with the operation of the coin chute. A suitable coin or token register is connected in a circuit which is controlled by the individual coins. The actuating coils of these respective counters are in series with the actuating coil of the electro-magnetic device 16 for operating the locking mechanism of the turnstile so that every time one fare is registered the locking means is rendered inoperative to permit the pivotal movement of the turnstile by a passenger. To this end, the register 32 is adapted to register the number of dimes deposited, the register 34 registers the number of nickels deposited and the register 35 registers the number of tokens deposited. Each of these registers has actuating coils 32a, 34a and 35a respectively. There is no register for the penny contact 23 because, as is common practice, it is not intended that pennies be accepted in this coin registering and collecting device. The pennies are returned to a side pocket (not shown). The coin contact 23 is connected directly in series with the actuating coil of the electro-magnetic device 27 which controls the master circuit contacts 28 and when a penny is deposited in the coin chute the circuit is immediately closed through the electro-magnetic device 27 which immediately breaks the contacts 28 without unlocking the turnstile, but drops the pennies on

an inclined chute from where they move to the side pocket.

The source of power, which if desired, may be the source used to operate the trains is connected between conductor 29 which is grounded at 40, and conductor 41. One side of all of the actuating coils for the coin and token registers are connected by a common conductor 36 through the actuating coil of the electro-magnetic device 16 and through the conductor 37 to the actuating coils of the electro-magnetic device 27 and contacts 28 to the side of the source of power represented by the conductor 41. The respective register coils 32a, 34a and 35a are connected respectively through conductors 32b, 34b and 35b, to the respective coin contacts 22, 24 and 25. When a nickel or a token is dropped in the coin chute the locking circuit is completed through the respective coin and the respective actuating coil of its associated register which registers the coin and energizes the electro-magnetic device 16 to unlock the turnstile. In each case as previously described, the electro-magnetic device 27 opens the contacts 28 and its further continued movement opens the contact door 26 to drop the coin or token away from its respective upper contact. As previously mentioned, when the electro-magnetic device 16 is actuated it automatically registers on the register of 18.

Special provision is made for permitting the unlocking of the turnstile more than once when a coin is deposited which represents an integral multiple of the price of one fare. In particular, the dime circuit is adapted to control special relays which control another circuit in which is arranged a circuit-closing device such as a push button by which the turnstile gate may be unlocked a second time. By this arrangement it makes it convenient for two parties who are traveling together and do not have the correct change for their individual fares so that one person may deposit a dime which will register fares and unlock the turnstile once and the other person, preferably in the opposite aisle of the passageway, may merely press a button to unlock the turnstile a second time. To this end a relay 46 is connected in parallel through a double pole, double throw switch mechanism 47 with the actuating coil 32a of the dime register 32. In this respect the dime contact 22 is connected through conductor 48 to contact 49 of the switch 47 and contact 51 of the switch is connected through conductor 52 to one side of the relay coil 46. The other side of this relay coil is connected through conductors 53 and 54 to the ground side of the actuating coil of the electro-magnetic device 16 which controls the lock for the turnstile. The circuit through the relay coil 46 is completed through the switch 47 by means of the switch blade 56. The switch blade 56 is actuated by a suitable magnetic core 57. From the description of the above circuit it will be apparent that when a dime is between the contact 22 and the ground contact plate 26 the actuating coil 32a and the relay coil 46 will be energized in a parallel circuit. The relative impedances of the actuating coil 32a and the relay coil 46 are such that sufficient current will go through the relay coil 46 to pull the switch blade 56 to the right in Figure 7 to disconnect the contacts 49 and 51, thereby opening the circuit through relay 46. Preferably the impedances of actuating coil 32a and relay coil 46 are equal and twice that of the actuating coils 34a and 35a.

In this way the total impedances of each of the coin circuits is substantially equal.

The energization of the relay 46 moves the switch blade 56 away from contacts 49 and 51 so that it engages contacts 58 and 59 which connects one side of a restoring relay coil 62 through conductor 61 to the conductor 54 which as previously indicated is connected to the ground side of the actuating coil 16. The other end of the restoring relay coil 62 is connected through a conductor 63 to a push button switch 64, one side of which is connected to ground 40 through a conductor 66. When the switch blade 56 is engaging the contacts 58 and 59 closing of the switch 64 places the restoring relay coil 62 in series with the actuating coil 16 which again unlocks the turnstile and permits the latter to be operated. It will be readily understood that each time the circuit through the actuating coil 16 is energized the master circuit breaker coil 27 opens the master contacts 28 immediately after the actuating coil 16 releases the pin 17 to unlock the turnstile so that the turnstile must be operated immediately or the locking pin 17 will return to the locking position. This feature encourages the passengers to move through the turnstile with an absolute minimum delay and thereby facilitates the handling of rush-hour traffic.

In connection with the operation of the device, when a dime is deposited, special means is provided for closing the upper end of the coin chute so that other coins or tokens cannot be deposited until the push button 64 has been operated to unlock the turnstile the second time. This special means comprises a narrow tongue 71 which is actuated by the magnetic core 57. The tongue 71 is adapted to move in slots in the opposite sides of the coin chute and is provided with a suitable slot 72. The slot is of sufficient width to accommodate the largest token or coin. When the core 57 is in the position shown in Figures 3, 4 and 7, the slot 72 will be aligned with the coin chute so that the coin may pass through the slot. Then in the event a dime is deposited the circuit through the relay 46 will be energized in the manner previously described and the magnetic core 57 will move to the right moving the tongue 71 therewith and moving the slot out of alignment with the coin chute, thereby preventing the entrance of additional coins until the push button 64 is operated to energize the restoring relay coil 62 which will move the core 57 to its normal position.

It will be noted that the magnetic core 57 is shown as a continuous member of constant diameter extending through both the relay coils 46 and the relay restoring coil 62. It is shown this way merely for purposes of illustration and it will be readily apparent to those skilled in the art that the magnetic core 57 in actual practice would not be continuous as shown but would be arranged in sections in such a way that the reluctance of the magnetic field of the relay coils 46 and 62 would be varied as it was moved under the influence of the energization of the two coils.

From the above description it will be apparent that this invention provides a novel coin control apparatus for controlling a turnstile for entrances to stations for transportation systems or other facilities. The arrangement is such that the turnstile can be unlocked only once for the deposition of each amount of coins or tokens representing one fare. Means is also provided for permitting the unlocking of the turnstile a number of times corresponding to an integral mul-

multiple of the amount of one fare which is represented by a single coin or token. In the form chosen to illustrate the invention, this provision is associated with the circuit controlled by a dime but it will be readily understood that the same principle may be applied to the circuits controlled by other coins or tokens.

Another important feature resides in the shape of the coin collecting chute which prevents unauthorized persons from energizing the coin controlled circuits to unlock the turnstile without depositing the appropriate coin or token.

Although the invention has been described in considerable detail, it will be apparent to those skilled in the art that many variations are possible without departing from the inventive concept. It is therefore desired that the invention not be limited except insofar as is made necessary by the prior art and by the appended claims.

I claim:

1. In a passageway controlling mechanism, a passageway barrier such as a gate or turnstile, means for locking said turnstile against operation, electrical means for rendering said locking means inoperative, coin or token controlled means for rendering said locking means inoperative to permit the operation of said barrier upon the deposition of a coin or token representing a multiple of the value of one fare and including holding circuit means energized on energization of said electrical means for establishing another circuit including a manually-operable push-button switch which circuit may be energized for rendering said locking means inoperative a second time to permit operation of said barrier.

2. In a passageway controlling mechanism, a passageway barrier such as a gate or turnstile, means for locking said barrier against operation, electrical means for rendering said locking means inoperative, coin or token controlled means for rendering said locking means inoperative to permit the operation of said barrier upon the deposition of a coin or token representing a multiple of the value of one fare and including an interlocking holding circuit for establishing another circuit including a manually-operable push-but-

ton switch, which circuit may be energized for rendering said locking means inoperative a second time to permit said operation of said barrier and means in said circuit for restoring said interlocking holding circuit to its normal condition.

3. In a passageway controlling mechanism, a passageway barrier such as a gate or turnstile, means for locking said barrier against operation, electrical means for rendering said locking means inoperative, coin or token controlled means for rendering said locking means inoperative to permit the operation of said barrier upon the deposition of a coin or token representing a multiple of the value of one fare and including an interlocking holding circuit for establishing another circuit including a manually-operable push-button switch, which circuit may be energized for rendering said locking means inoperative a second time to permit said operation of said barrier and means in said circuit for restoring said interlocking holding circuit to its normal condition, and means for registering the amount of money deposited and separate means for registering the number of times said locking means is made inoperative under the control of coins or tokens deposited in said coin control means.

CHARLES V. RICHEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
761,015	Spear	May 24, 1904
1,107,975	Marks	Aug. 18, 1914
1,172,195	Carter et al.	Feb. 15, 1916
1,221,268	Andreatte	Apr. 3, 1917
1,724,932	Hedley	Aug. 20, 1929
1,737,422	Hulme	Nov. 26, 1929
1,772,468	Slawson	Aug. 12, 1930
1,810,967	Hulme	June 23, 1931

FOREIGN PATENTS

Number	Country	Date
24,125	Great Britain	1909