July 7, 1931. R. V. WILSON 1,813,720

AUTOMATIC CHANGE MACHINE

Filed April 19, 1929 5 Sheets-Sheet 1

Fig. 2.

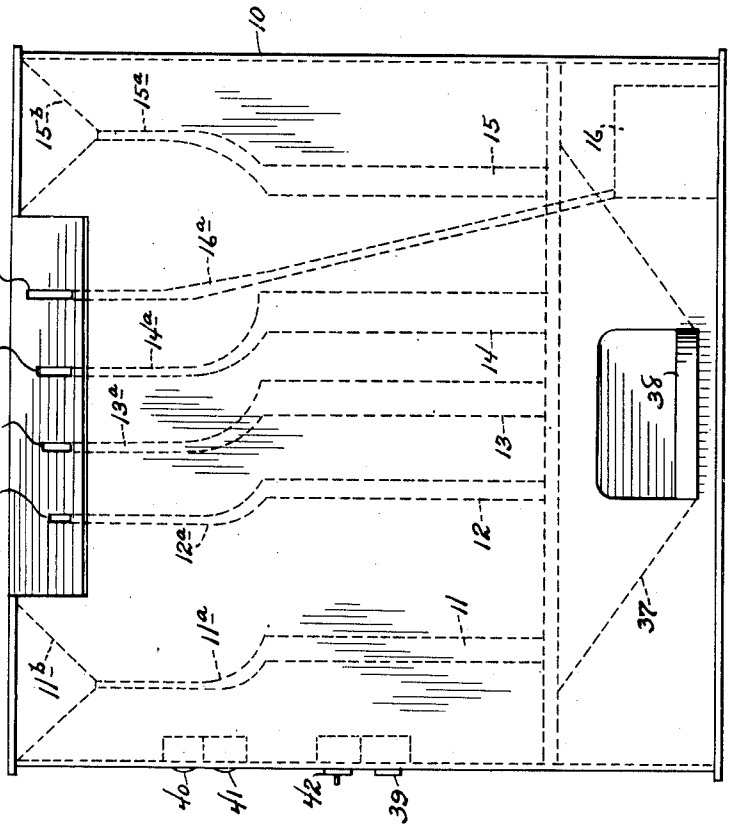
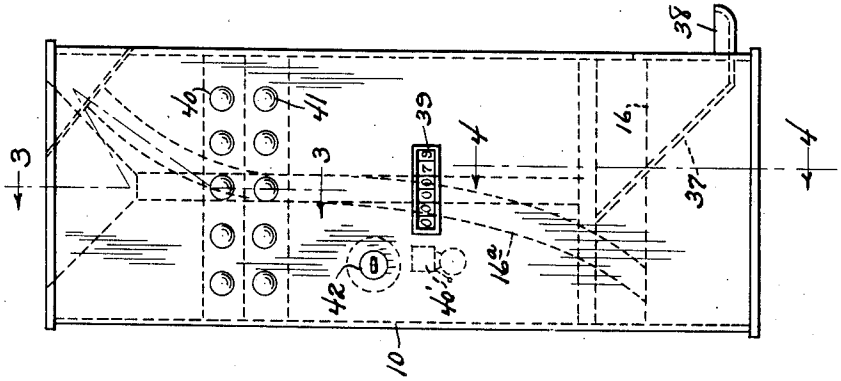


Fig. 1.



Inventor

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By Victor J. Evans

Attorney

Witness

July 7, 1931. R. V. WILSON 1,813,720

AUTOMATIC CHANGE MACHINE

Filed April 19, 1929 5 Sheets-Sheet 2

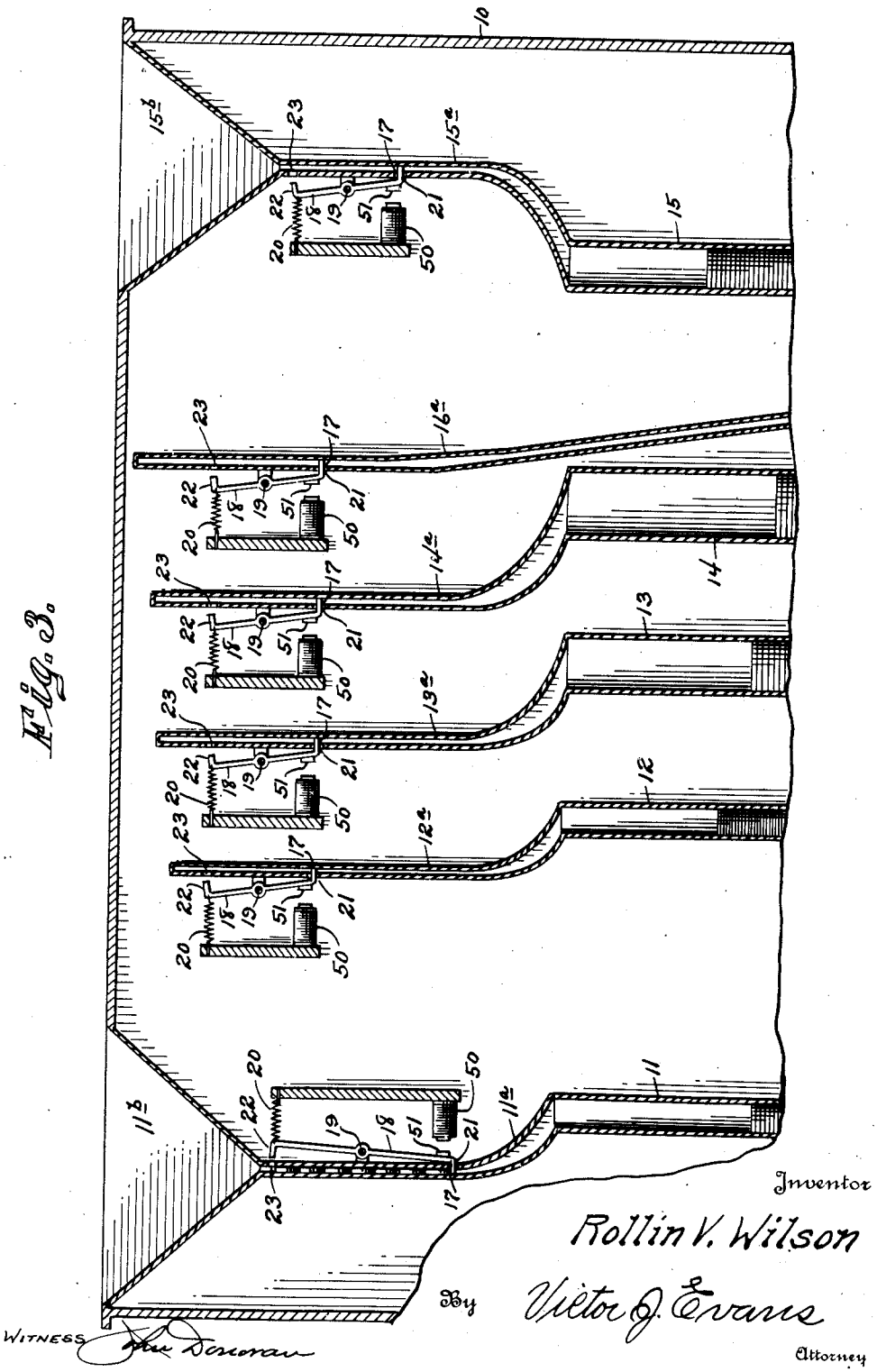


Fig. 3.

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July 7, 1931. R. V. WILSON 1,813,720

AUTOMATIC CHANGE MACHINE

Filed April 19, 1929 5 Sheets-Sheet 3

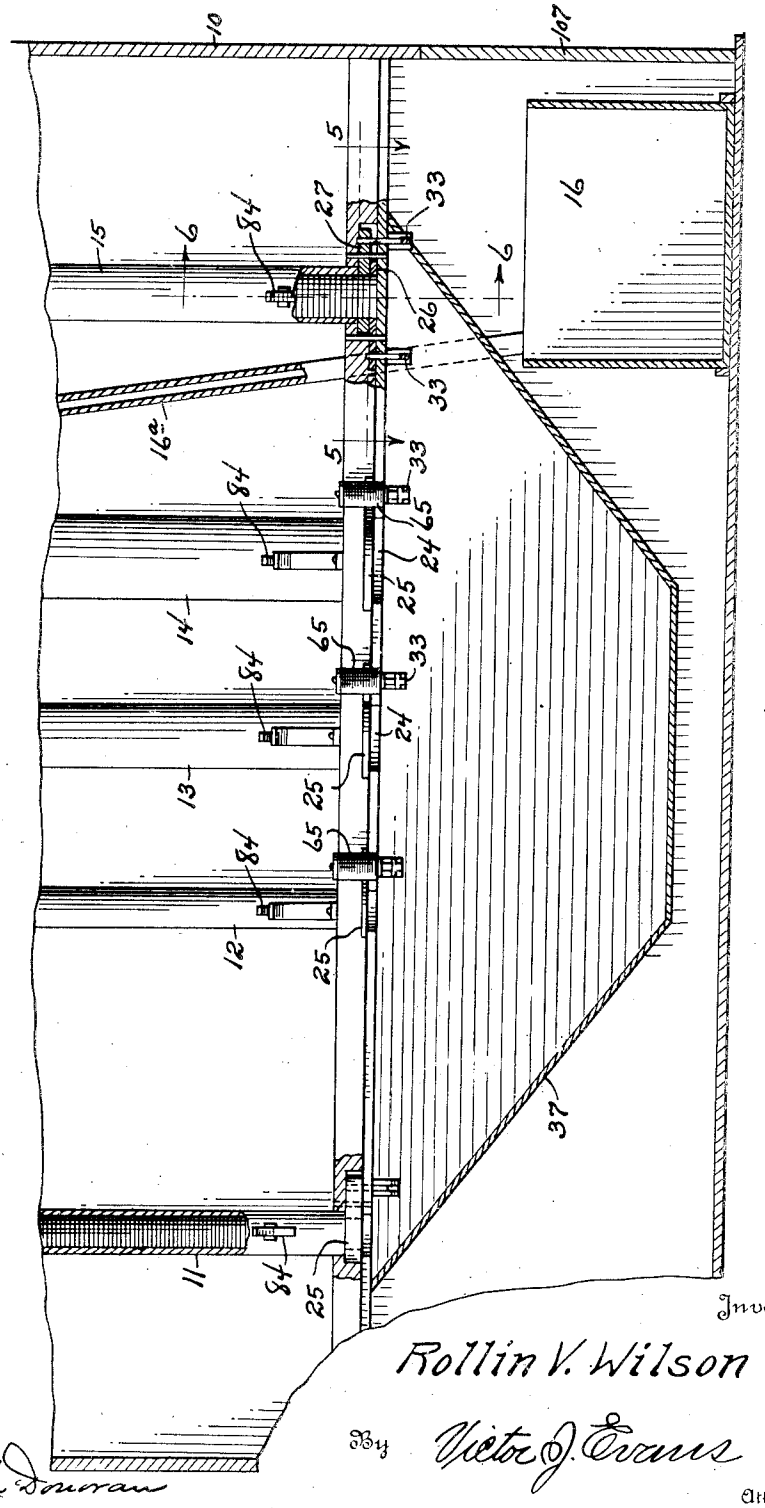


Fig. 4.

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WITNESS

Jas. Donovan

July 7, 1931. R. V. WILSON 1,813,720

AUTOMATIC CHANGE MACHINE

Filed April 19, 1929 5 Sheets-Sheet 4

Fig. 5.

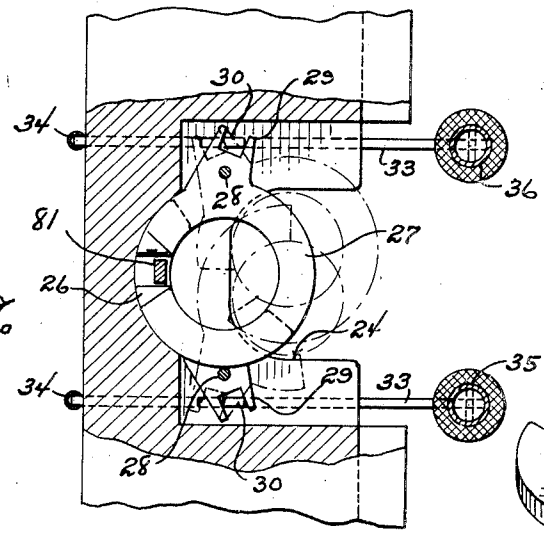


Fig. 7.

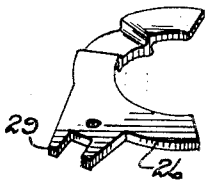


Fig. 8.

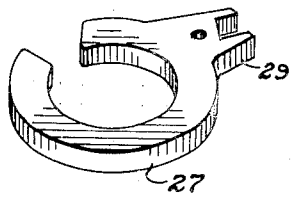
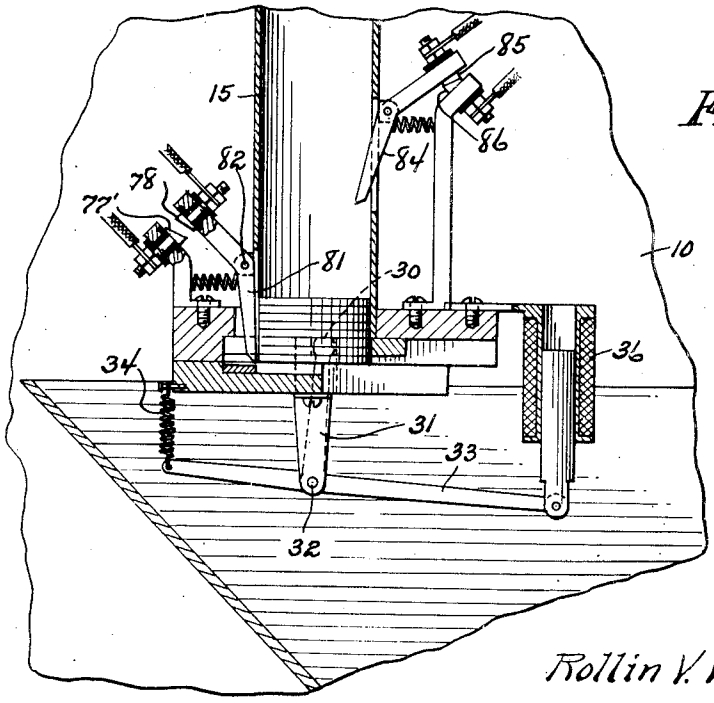


Fig. 6.



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July 7, 1931. R. V. WILSON 1,813,720

AUTOMATIC CHANGE MACHINE

Filed April 19, 1929 5 Sheets-Sheet 5

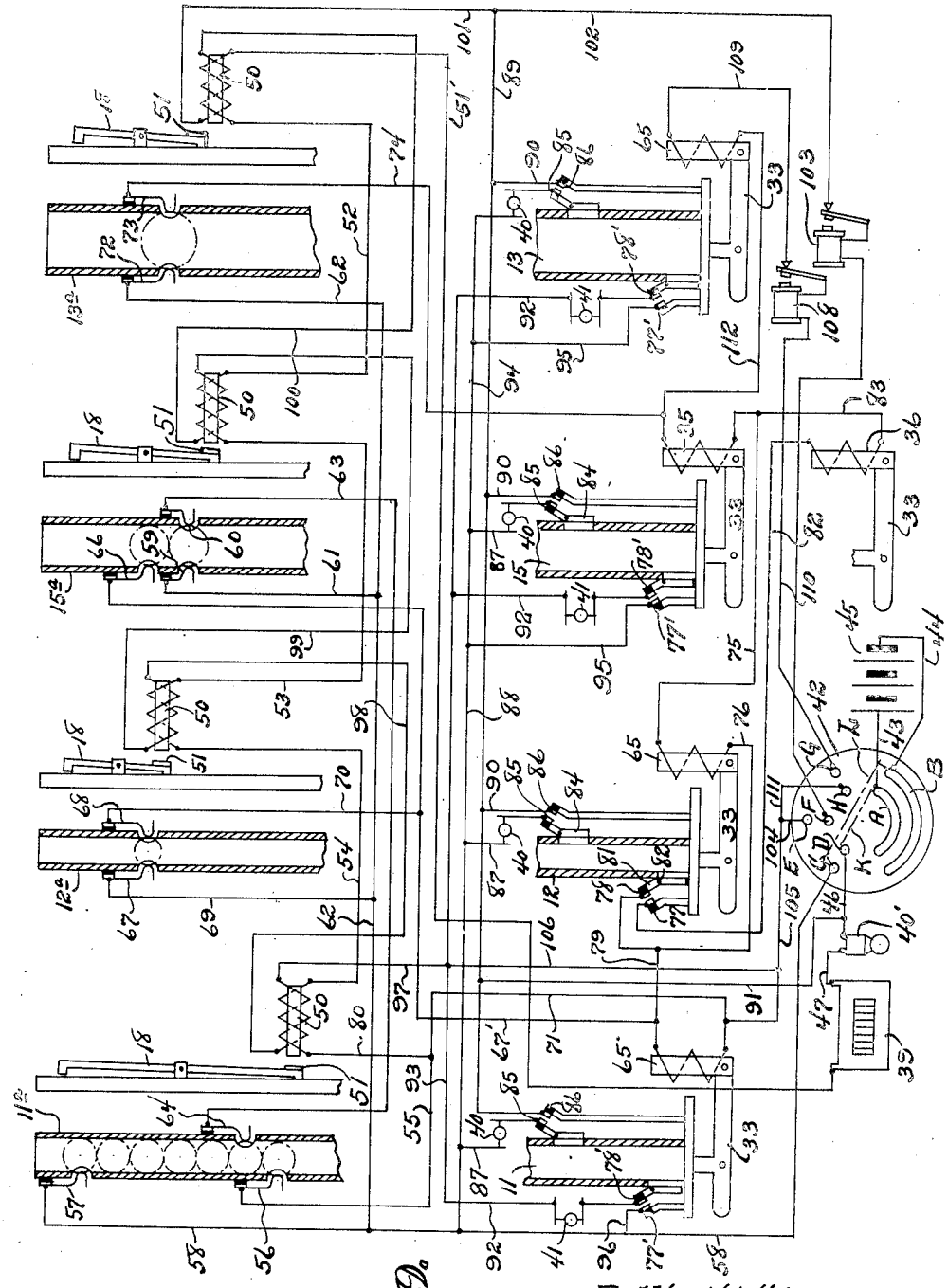


Fig. 9.

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BY Victor J. Evans ATTORNEY

WITNESS: John Donovan

Patented July 7, 1931

1,813,720

UNITED STATES PATENT OFFICE

ROLLIN V. WILSON, OF MEMPHIS, TENNESSEE, ASSIGNOR OF ONE-HALF TO SAM L. FRANKLIN, OF KNOXVILLE, TENNESSEE

AUTOMATIC CHANGE MACHINE

Application filed April 19, 1929. Serial No. 356,439.

This invention relates to change making machines capable of use upon street cars and other public vehicles for the purpose of receiving deposited fares, delivering change when such change is necessary and registering the number of fares deposited.

Some street railway companies provide change making machines in which the operator places the fare and where change is necessary, he secures the change through the hand operation of suitable levers which release coins of different denominations. For example, if a twenty-five cent coin is deposited in the machine and the rate of fare is seven cents, the machine returns one metal fare check or token, three one cent coins, one ten cent coin and one five cent coin. Change is deposited in the passenger's hand and he must separate the fare check from the balance of the coins and drop the check in the fare box.

The operator (the motorman of the car where one man cars are operated) must observe this procedure through glass windows in the box in order to see that the passenger has deposited the correct coin. He must then push a small lever to drop the coin into the money compartment of the box and these coins must be retrieved to be again used as change. This is effected by turning a small crank which runs the coins through the register mechanism and by taking the coins out of the return receptacle of the fare box. The coins and fare checks or tokens must be again separated and placed separately in the hand operated change making machine.

Many of these operations must necessarily be done while the car is in motion so that the attention of the motorman is diverted from the operation of the car. This naturally lowers his efficiency and is hazardous to the safe and proper operation of the car.

The present invention overcomes these and many other disadvantageous features by providing a machine, which upon the insertion of a coin or coins of a given amount, will operate a register, and where the amount of the coin or coins is in excess of such sum the machine will automatically return the proper change without attention by the motorman or other operator of the car.

Another object of the invention is the provision of a machine which will be automatic in its operation, so that a passenger may deposit his fare and receive the proper amount of change where change is due without requiring the attention of the operator, so that the machine is especially adapted for use upon "one man" cars or other vehicles.

Another object of the invention is the provision of means for signalling the driver of the vehicle so that he will not be obliged to divert his attention from the operation of the vehicle in order to see that the passenger has deposited his fare.

Another object of the invention is the provision of a machine in which coins of different denominations are received in separate receptacles and utilized for making change, means being provided for operating a warning signal when the coins are nearly exhausted, and for operating an additional signal when any of the receptacles are empty.

With the above and other objects in view, the invention further includes the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings:—

Figure 1 is an end view of a machine constructed in accordance with the invention.

Figure 2 is a front view.

Figure 3 is an enlarged fragmentary sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a like view taken substantially on the line 4—4 of Figure 1.

Figures 5 and 6 are enlarged fragmentary sections taken respectively on the lines 5—5 and 6—6 of Figure 4.

Figure 7 is a detail perspective view of the single coin ejector for the five cent receptacle.

Figure 8 is a like view of the double coin ejector for the five cent receptacle.

Figure 9 is a diagram of the electric circuits.

Referring to the drawings in detail wherein like characters of reference denote corresponding parts, the reference character 10 indicates a housing of suitable size and shape to contain a number of separate coin receptacles for receiving coins of different value. Six receptacles are shown, but it is obvious that the invention need not be restricted to any particular number of receptacles.

The receptacles as stated are designed to receive coins of different values, the receptacle 11 receiving one cent coins or pennies, the receptacle 12 receiving dimes, the receptacle 13 quarters, the receptacle 14 fifty cent pieces, and the receptacle 15 nickels. The receptacles are of a proper size so that the coins will be stacked one upon the other and the coins are directed into these receptacles through coin chutes 11*a*, 12*a*, 13*a*, 14*a*, and 15*a* respectively. The chutes 12*a*, 13*a* and 14*a* are open at the top as indicated at 12*b*, 13*b* and 14*b*, while the chutes 11*a* and 15*a* are provided with hoppers 11*b* and 15*b*, respectively.

In addition, the housing contains a receptacle 16 which is adapted to receive one dollar coins or tokens which are deposited in the said receptacle through a chute 16*a* whose upper open end is indicated at 16*b*.

Each of the coin chutes is closed by an angular extension 17 at one end of a lever 18. These levers are pivotally mounted as shown at 19 and are yieldingly held in position so that the extension 17 will close the chute, by means of a spring 20. The extensions 17 of the levers 18 enter the chutes through openings 21 provided in one wall of the chutes. The levers 18 are also provided at their upper ends with angular extensions 22 which are adapted to enter the chutes through openings 23 so as to close the chutes in a manner and for a purpose to be presently described.

Each of the coin receptacles 11, 12, 13, 14 and 15 is provided in its bottom with a discharge outlet 24 which is controlled by a pivotally mounted ejector 25. These ejectors are of the thickness of one coin and have an opening of the diameter of the coin and when pivotally moved will eject a single coin. In the receptacle 11 for the one cent coins, the ejector may be of a thickness to eject more than one coin. For example, when the machine is used upon a car with a seven cent fare and ten cents is deposited, the ejector for the one cent receptacle will be of a thickness to eject three one cent coins. Also, the receptacle 15 for the five cent coins may be arranged to eject either a single five cent coin, or three five cent coins according to circumstances.

For this purpose, the ejecting mechanism for the five cent coin receptacle which is shown in detail in Figures 5 and 6 consists of an ejector 26 for a single five cent coin and an ejector 27 for two five cent coins. These ejectors are pivotally mounted as shown at 28 and have extending therefrom spaced lugs 29 which receive the upper end 30 of arms 31, one of which is positioned upon each side of the five cent receptacle 15. These arms are pivotally mounted as shown at 32 and are rigid with a lever 33, the latter being yieldingly held against pivotal movement by a spring 34. This spring acts to hold the ejectors in normally retracted position, while solenoids 35 and 36 have their cores pivotally connected with the levers 33 and when energized will move the levers pivotally to operate the ejectors.

The ejected coins from the receptacles will be received within a chute 37 and directed into a delivery receptacle 38 from which the passenger may remove them.

In addition, the insertion of coins of a given amount (for example seven cents) will close a circuit through a register mechanism 39 and a bell or other alarm device 40′, so that each fare paid will be registered and the bell will be operated to direct attention to the insertion of the fare. In addition, indicating means are provided for indicating the approximate number of coins within the coin receptacles so that the receptacles may be refilled before being entirely emptied and should the latter inadvertently occur additional signals are provided for indicating the fact that the receptacles are empty.

For this purpose lamps 40 are provided to indicate that the supply of coins is running low while lamps 41 provide indicating means that the supply of coins within a particular receptacle has become entirely exhausted.

As the coin receptacles must contain coins to be used in making change, means are provided for filling these receptacles without operating the register 39 or the bell 40′. In addition, the invention also provides means whereby all of the receptacles may be emptied without inserting coins into the coin chutes. For this purpose the invention provides a switch 42 having arcuate-shaped contact strips A and B and contacts C, D, E, F, G and H, together with suitable bridge elements K and L for bridging these contacts to selectively control circuits to operate the machine as stated.

The contacts A and B are connected by conductors 43 and 44 respectively to a suitable source of current such as a battery 45 while a conductor 46 connects the contact D with the bell 41′ and the latter is in turn connected by means of a contact 47 with the register 39. This register is in electrical connection with an electromagnet 50, through the medium of a conductor 51′, there being one of these magnets for each of the

levers 18. By reference to the diagram shown in Figure 9 it will be seen that each of the levers 18 is provided with an armature 51 which is located in the path of a magnet 50 so that when this magnet is energized, the lever 18 will be moved against the action of the spring 20 to withdraw the angular extension 17 from the chute.

While six coin chutes are illustrated in the drawings only four are shown in the diagram, namely, the chutes for the one cent, ten cent, five cent, and twenty-five cent coins. The operation of the levers 18 for the fifty cent coins and one dollar coins is the same as the twenty-five cent coin chute.

The magnet 50 of the twenty-five cent coin chute is connected by a conductor 52 to the magnet 50 of the five cent coin chute and this last mentioned magnet is connected by means of a conductor 53 with the magnet of the ten cent coin chute. Likewise, this last mentioned magnet is connected by means of a conductor 54 with the magnet 50 of the one cent chute, while this last referred to magnet is connected by means of a conductor 55 with a yieldable contact 56 which is mounted upon and insulated from the chute 11*a*. The contact 56 extends into an opening provided in the chute 11*a* while a similar contact 57 extends through another opening provided in the chute above the contact 56. The contact 57 is connected by means of a conductor 58 with the contact C of the switch 42.

Assuming that the fare to be paid amounts to seven cents and seven pennies are inserted in the chute 11*a*, the first penny inserted will engage the angular extension 17 of the arm 18 and will be held against movement until the entire seven pennies have been placed within the chute. As soon as this occurs, current will flow from the battery 45 through the conductor 44, the contact B, the bridge L, the contact C, the conductor 58, the contact 57, the coins within the chute 11*a*, the contact 56, the conductor 55, the magnets 50, the conductor 51′, the register 39, the conductor 47, the bell 40′, the conductor 46, the contact D, the bridge K, the contact A and back to the battery through the conductor 43. As all of the magnets 50 will then be energized, the armatures of the levers 18 will be attracted so that these levers will be moved pivotally to release the pennies as stated while the angular extensions 22 of the levers 18 will move into the chutes and prevent the insertion of any additional coins until the magnets 50 are de-energized. This will occur through the interruption of the circuit by the passage of the coins into the receptacle 11. The levers 18 will then assume their normal positions under the action of the springs 20.

The chute 15*a* for the five cent coins is provided with spaced contacts 59 and 60 which extend into openings provided in the chute in the path of the coins. The contact 59 is connected by means of a conductor 61 with a conductor 62 which is tapped onto the conductor 58 while the contact 60 is connected by a conductor 63 with a contact 64 which is carried by and extends into the chute 11*a* in the path of the coins within the chute.

Should a nickel and two pennies be inserted in payment of a seven cent fare, a circuit will be completed from the battery through the switch 42, the current travelling from the contact C through the conductor 58, the conductor 62, the conductor 61, the contact 59, the coin, the contact 60, the conductor 63, the contact 64, the two coins within the chute 11*a*, the contacts 56, the conductor 55, the magnets 50, the conductor 51′ and back to the switch through the register 39 and bell 40′.

As previously stated, the receptacle 15 for the five cent coins is provided with two solenoids 35 and 36 to control the discharge of coins through this receptacle, while the receptacles 11, 12 and 13 are each provided with a solenoid 65. When the solenoids 65 are energized, the ejector 25 will be actuated to deliver a single coin from either the receptacle 12 or 13, or three coins from the receptacle 11. Thus, should two nickels be inserted in the chute 15*a*, the mechanism would operate to actuate the register 39 and the signal 40′ as previously explained, and in addition, the ejector 25 of the receptacle 11 would be actuated to deliver three pennies change. For this purpose, the chute 15*a* has mounted thereon a spring contact 66 which is connected by means of a conductor 67′ with the solenoid 65 which controls the discharge of coins from the receptacle 11. The ejector of the chute 11 would be moved pivotally in the manner previously described to discharge and deliver three pennies.

Should a dime be inserted in the chute 12*a* in payment of a seven cent fare, this dime would bridge contacts 67 and 68. This first mentioned contact is connected by a conductor 69 with the conductor 62 while the contact 68 is connected by a conductor 70 with the conductor 67′ so that a circuit would be closed through the magnet 65 of the receptacle 11 and deliver three pennies as previously explained. A circuit would also be completed through each of the magnets 50 through a conductor 71 which connects the solenoid 65 of the receptacle 11 with the magnet 50 of the lever 18 which controls the chute 11*a*. As all of the magnets 50 are connected in series, all of the levers 18 will be actuated as previously described. This manner of energizing the magnets 50 upon the insertion of two nickels will also occur.

Should a coin of the denomination of twenty-five cents be inserted in the chute

13a it will bridge contacts 72 and 73. This first mentioned contact is connected to the conductor 62, while the contact 63 is connected by means of a conductor 74 with the solenoid 35 of the receptacle 15 which contains five cent coins. The solenoid 35 is connected by a conductor 75 with a solenoid 65, while a conductor 76 connects the solenoid 65 with a stationary contact 77. This contact is adapted to be engaged by a contact 78 which is connected by a conductor 79 with the solenoid 65 of the receptacle 11. The contacts 77 and 78 are separated by coins within the receptacle 12, and are only closed when the receptacle 12 is empty.

When a twenty-five cent coin is inserted, current will flow from the switch L through the conductor 58, the conductor 62, the contact 72, the coin within the chute 13a, the contact 73, the conductor 74, the solenoid 35, the conductor 75, the solenoid 65 of the receptacle 12, the conductor 76, the conductor 79, the solenoid 65 of the receptacle 11, the conductor 71, a conductor 80 and through the magnets 50 and back to the switch through the conductor 51', the register 39 and the signal 40'. The solenoid 35 will thus be actuated to deliver a nickel from the receptacle 15, while the solenoids 65 of the receptacles 12 and 11 will be operated to deliver a dime and three pennies into the receptacle 38.

In the event that the ten cent receptacle 12 is empty, three nickels will be delivered from the receptacle 15. For this purpose, the contact 78 is mounted upon one end of an arm 81 which is pivotally mounted as shown at 82 and has its other end adapted to extend into the receptacle 12 through a suitable slot provided in said receptacle. As the outer or contact end of the arm 81 is heavier than the inner or lower end, the contact 78 will engage the contact 77 and complete a shunt circuit through the solenoid 36 through the medium of conductors 82 and 83. As both the solenoid 35 and the solenoid 36 will be energized, three nickels will be delivered from the receptacle 15. The magnet 50 of the chute 13a will actuate the lever 18 to release the coin while the other magnets 50 will operate their respective levers to close the other chutes.

The insertion of a fifty cent coin within the chute 14a will return forty-three cents change, while the insertion of a coin of the value of one dollar will return ninety-three cents change. As the operation for the fifty cent coin and the one dollar coin is similar to the operation previously described it is not believed necessary to further illustrate or describe the same.

When the coins within any of the receptacles except the receptacle 16 reach a predetermined number, the warning lamp 40 of the particular receptacle will be lighted. For this purpose each of the receptacles carries a pivotally mounted arm 84 which carries a contact 85. This contact is normally spaced from a stationary contact 86 and is held in spaced relation by the coins within the receptacle. However, when the coins fall below the lower end of the arm 84, the latter is permitted to enter the receptacle through a slot provided therein so that the contacts 85 and 86 engage. When this occurs, current will flow from the switch through the conductor 58 and through the lamp 40 of the particular receptacle, the lamp being connected in a conductor 87 which connects the contact 85 with a conductor 88. The stationary contacts 86 are connected to a conductor 89 by conductors 90, while current flows from the conductor 89 back to the switch 42 through a conductor 91 which is tapped onto the conductor 46.

In addition, each of the receptacles 11, 13, 14 and 15 is provided with contacts 77' and 78', which are similar to the contacts 77 and 78 and are controlled by coins within the receptacles. The contacts 78' have connected thereto conductors 92 in which are included lamps 41, while the conductors 92 are connected to a conductor 93. The contacts 77' for receptacles 13 and 15 are connected to a conductor 94 by conductors 95 and the conductor 94 is connected to the conductor 58. Contact 77' for receptacle 11 is connected to conductor 58 by a conductor 96.

Should any of the receptacles 11, 13, 14 or 15 become empty, the contacts 77' and 78' would close so that current would flow from the switch 42 through the conductor 58, the conductor 96 to the contact 77' of the receptacle 11, the contact 78', the lamp 41. From the lamp 41, current flows through the conductor 92, the conductor 93, a conductor 97 to the coil 50 of the chute 11a and from this coil to the coils 50 of the other chutes through conductors 98, 99 and 100. From the coil 50 of the chute 13a, current flows through a conductor 101 to the conductor 89, returning to the switch 42 through the conductor 91, which is tapped onto the conductor 46 between the switch and the bell 40', so that this bell and the indicator 39 is eliminated from this circuit. From this it will be seen that when the penny receptacle 11 is empty its signal lamp 41 will be illuminated and all of the coin chutes will be closed so that no coins may be inserted.

Should the coins in any of the other receptacles become exhausted their contacts 77' and 78' will be closed after the manner of the contacts employed in connection with the receptacle 11, the only exception being the receptacle 12 for the ten cent coins. The contacts 77 and 78 of the receptacle 12 close to insure the discharge of two nickles from

the receptacle 15, as previously described.

Should the coins of the five cent, twenty-five cent etc. receptacles become exhausted, the contacts 77′ and 78′ of the particular receptacle involved will be closed. Taking for example, the five cent receptacle or the receptacle 15, current will flow from the switch 42 through the conductor 58, the conductor 94, the conductor 95, the contacts 77′ and 78′, the conductor 92 and lamp 41, the conductor 93, the conductor 97 and the coils 50 after the manner previously stated. From the last coil 50 current will flow through the conductor 101, the conductor 89 and the conductor 91 back to the switch.

In order to facilitate refilling the machine provision is made for intermittently operating all of the levers 18 so that the coins will pass through the chutes into the receptacles without operating the register 39 or the signal 40′. For this purpose a conductor wire 102 is tapped onto the conductor wire 101 and is connected to a vibrator 103 and this vibrator is connected to the contact F of the switch 42, this contact being connected with the contact A by means of the bridge K.

The bridge L connects the contact B with the contact E. This last mentioned contact is connected by means of a conductor 104 with a conductor 105 which has connected thereto a conductor 106 having connection with the conductor 97. Current will then flow from the switch 42 through the conductors just mentioned and through each of the magnets 50, returning to the switch through the conductors 101, 102 and the vibrator 103. The coil of the vibrator will then be energized so that the magnets 50 will be intermittently operated to alternately open and close the coin chutes to permit of the passage of coins through these chutes to the receptacles.

In addition to automatically opening a particular coin receptacle or combination of receptacles to deliver change, the invention also provides means for opening all of the receptacles 11, 12, 13, 14 and 15 so that the contents of the receptacles may be deposited into the delivery receptacle 38. A suitable door 107 is provided for obtaining access to the contents of the receptacle 16.

To empty the receptacles 11, 12, 13, 14 and 15, the solenoids 35 and 65 are connected in circuit with a vibrator 108. This vibrator is connected to the last solenoid 65 (which is the solenoid shown in connection with the receptacle 13 in Figure 9 of the drawings) by a conductor 109. The vibrator is connected by a conductor 110 with the contact G of the switch 42. The contact H of this switch is connected by a conductor 111 with the solenoid 65 of the receptacle 11.

When the bridge L is positioned to connect the contacts B and G and the bridge K positioned to connect the contacts A and H, current will flow from the contact H of the switch through the conductor 111 to the coil 65 of the receptacle 11 and from this coil through the conductor 79 to the conductor 76, the coil 65 of the receptacle 12, the conductor 75, the coil 35, the conductor 112, the coil 65, the conductor 109, the coil of the vibrator 108 and back to the switch through the conductor 110. The vibrator will then operate to intermittently energize the solenoids 35 and 65 to empty the receptacles.

It will be apparent from the foregoing description and accompanying drawings that the invention provides a machine into which the exact amount of the fare may be deposited through a number of coins of a single denomination or a combination of coins, and when deposited will operate a register to indicate the number of fares. In addition, the machine will operate to sound an alarm or signal. The invention also provides a machine into which coins up to the amount of one dollar may be inserted and change automatically delivered over a given amount. Means are further provided to close all of the coin chutes upon the insertion of a fare, except the chute into which the fare is inserted and to maintain these chutes in closed position until the inserted coins have passed through the chutes.

Also, means are provided for simultaneously emptying all of the coin receptacles and to facilitate filling the receptacles without operating the register of the signal device. In addition to the foregoing, the invention provides means for operating a signal to indicate the fact that the coins in one or more receptacles are nearly exhausted, while additional signals are provided which are actuated when one or more of the coin receptacles are completely empty.

The invention is susceptible of various changes in its form, proportions and minor details of construction and the right is herein reserved to make such changes as properly fall within the scope of the appended claims.

Having described the invention what is claimed is:—

1. In a machine of the character described, a housing, separate coin receptacles therein, each receptacle being adapted to receive coins of a given value, individual coin chutes for said receptacles, means normally closing the chutes to prevent the passage of coins from said chutes into the receptacles, electrically controlled means to operate the chute closing means to permit of the passage of coins into the receptacles, electrically operated means controlled by the coins within the chutes to discharge coins from the receptacles, and electrically controlled means including the means for

normally closing the chutes to intermittently open the chutes to fill the receptacles.

2. In a machine of the character described, a housing, separate coin receptacles therein, each receptacle being adapted to receive coins of a given value, individual coin chutes for said receptacles, means normally closing the chutes to prevent the passage of coins from said chutes into the receptacles, electrically controlled means to operate the chute closing means to permit of the passage of coins into the receptacles, electrically operated means controlled by the coins within the chutes to discharge coins from the receptacles, electrically controlled means including the means for normally closing the chutes to intermittently open the chutes to fill the receptacles, and electrically controlled means to discharge all of the coins from the receptacles.

3. In a machine of the character described, a housing, separate coin receptacles therein, each receptacle being adapted to receive coins of a given value, individual coin chutes for said receptacles, means normally closing the chutes to prevent the passage of coins from said chutes into the receptacles, electrically controlled means to operate the chute closing means to permit of the passage of coins into the receptacles, electrically controlled means including the means for normally closing the chutes to intermittently open the chutes to fill the receptacles, electrically operated means controlled by the coins within the chutes to discharge coins from the receptacle, electrically controlled means to discharge all of the coins from the receptacles, and selective means to control the operation of the chute closing means, the chute filling means and the receptacle discharging means.

4. In a machine of the character described, a housing, separate coin receptacles therein, each receptacle being adapted to receive coins of a given value, individual coin chutes for said receptacles, levers pivotally mounted adjacent the chutes and adapted to have either of their ends extended into the chutes to prevent the passage of coins therethrough, means to yieldingly hold one of the ends of the levers within the chutes, means operable upon the insertion of coins of a given value to move the levers pivotally and position their other ends within the chutes, and means to intermittently operate the lever moving means, and means operated by inserted coins to discharge coins from the receptacle.

In testimony whereof I affix my signature.

ROLLIN V. WILSON.