July 11, 1933. E. H. THOMPSON 1,917,615

FARE COLLECTION APPARATUS

Filed Nov. 18, 1931 4 Sheets-Sheet 1

Fig. 1.

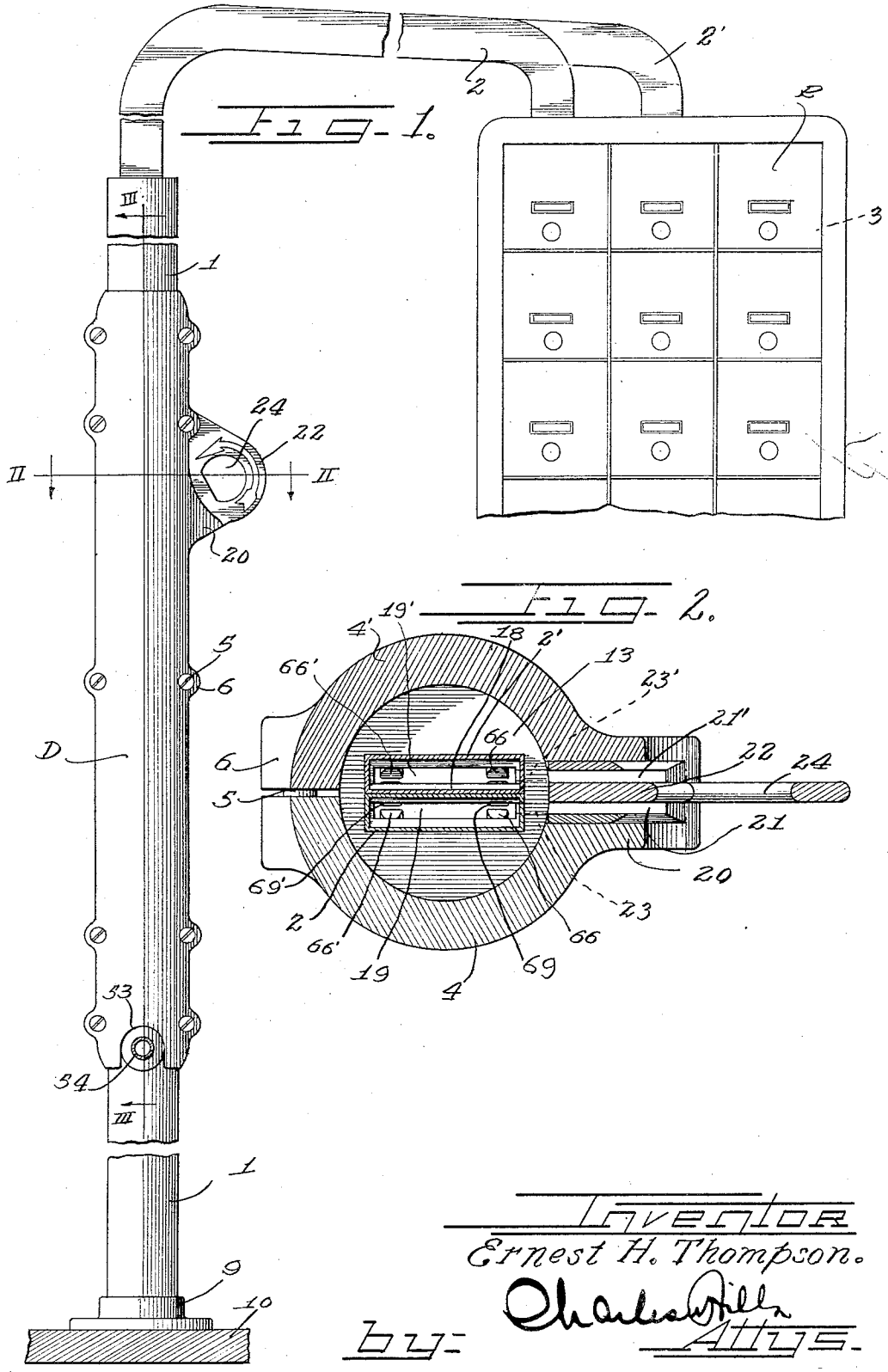


Fig. 2.

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FARE COLLECTION APPARATUS

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Fig. 3.

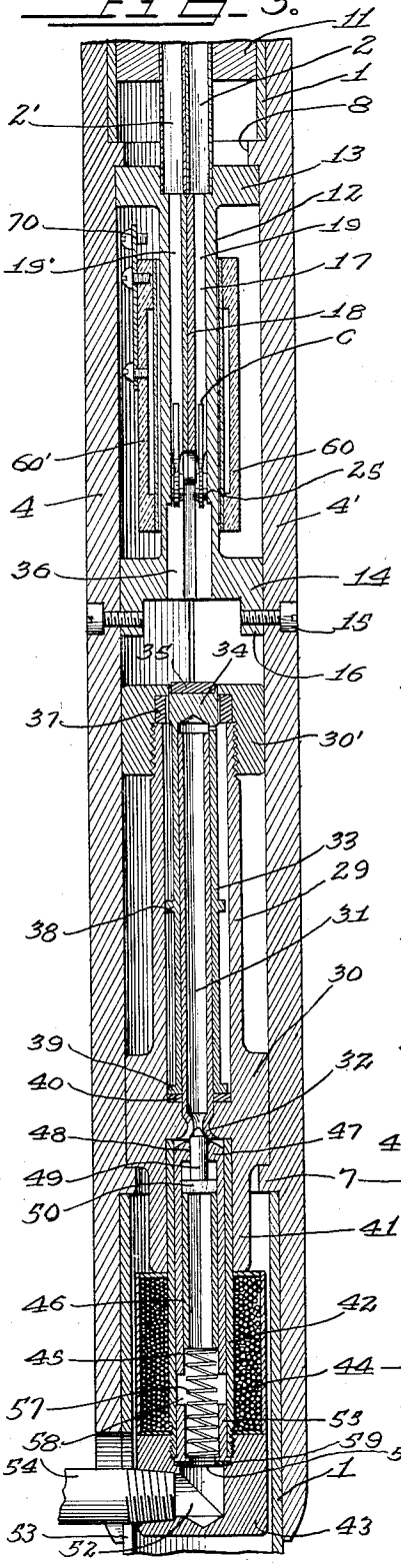


Fig. 4.

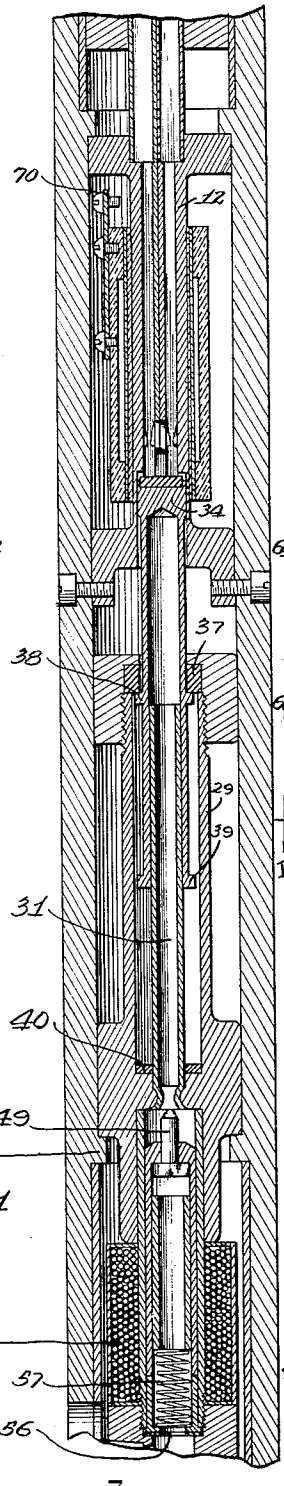
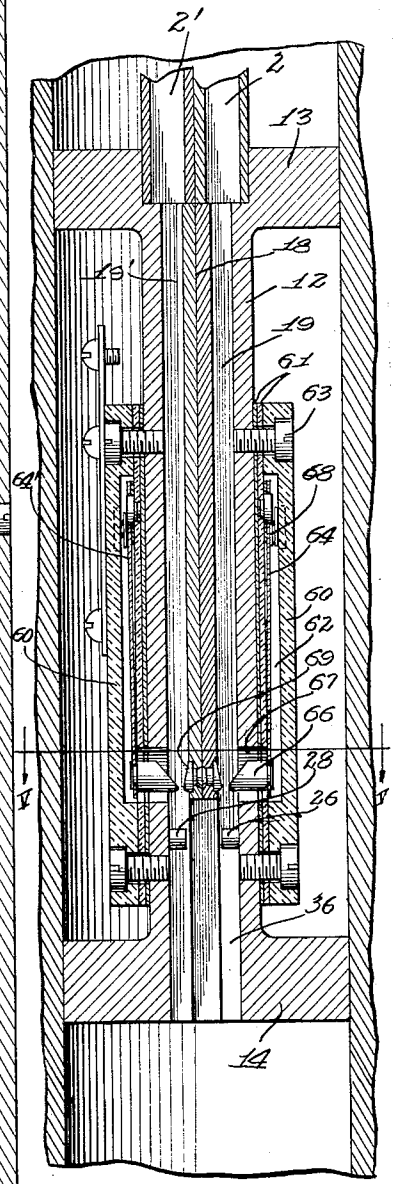


Fig. 6.



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FARE COLLECTION APPARATUS

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Fig. 5.

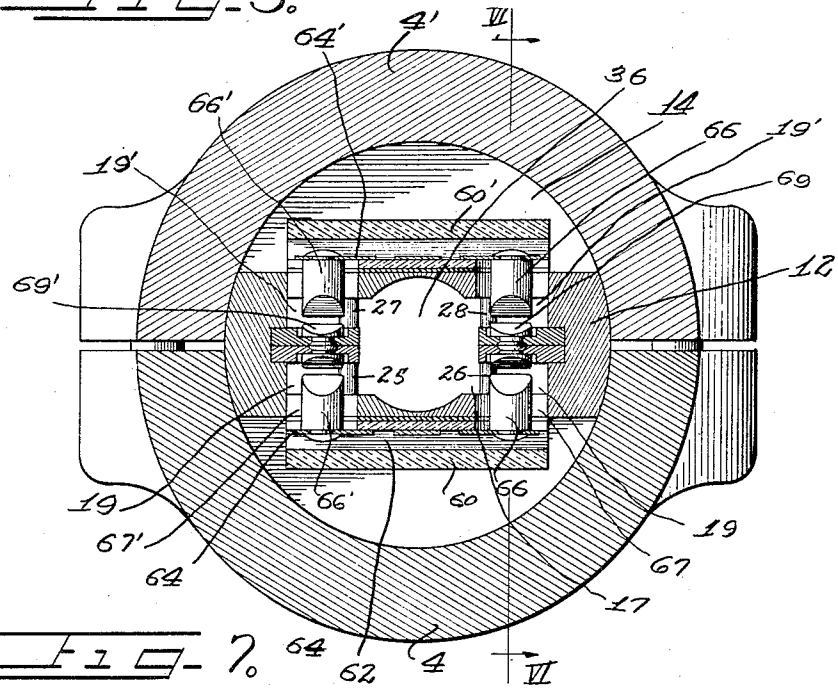


Fig. 7.

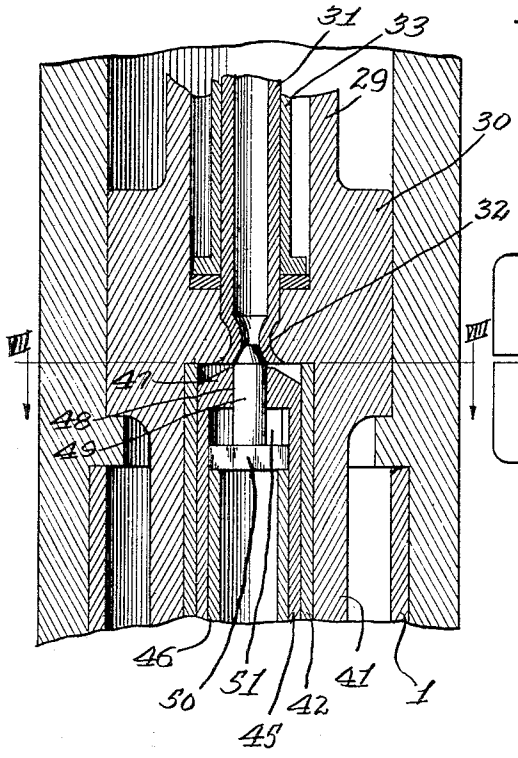
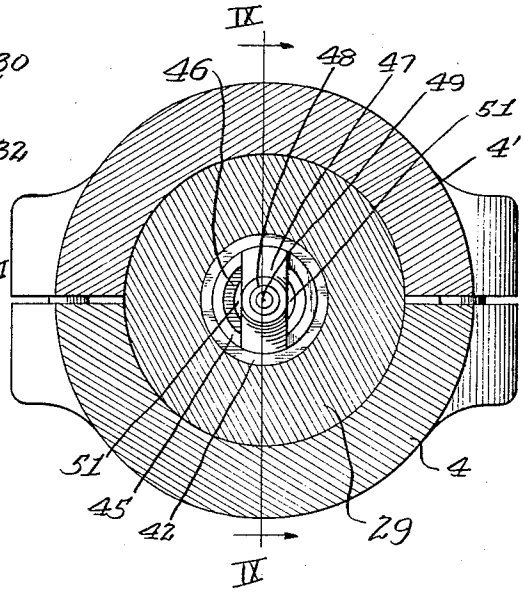


Fig. 8.



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FARE COLLECTION APPARATUS

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Fig. 11.

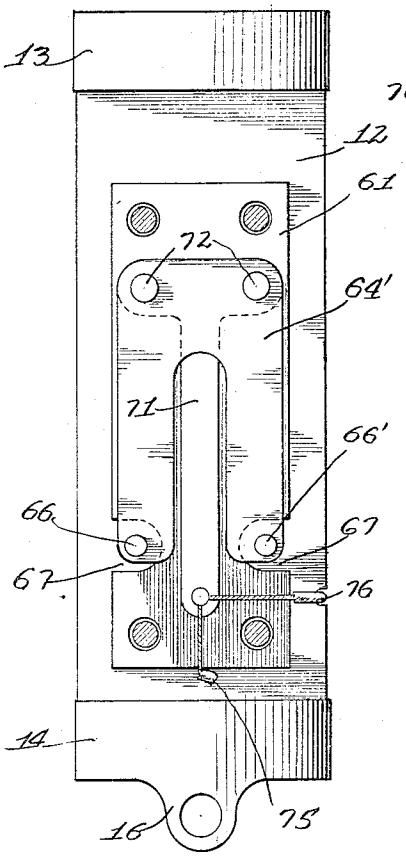


Fig. 10.

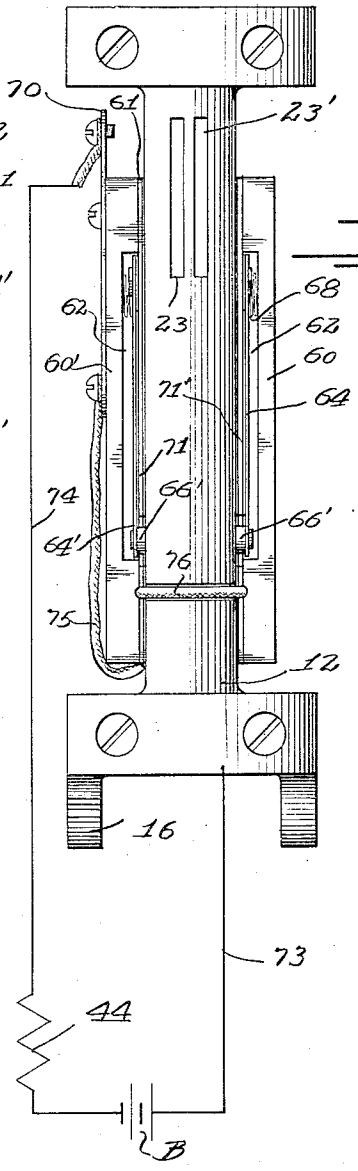
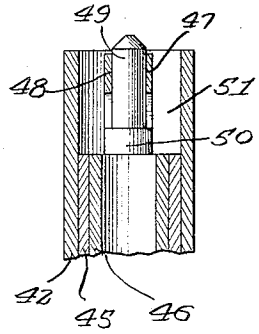


Fig. 9.



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Patented July 11, 1933 1,917,615

UNITED STATES PATENT OFFICE

ERNEST H. THOMPSON, OF WINNETKA, ILLINOIS, ASSIGNOR TO JOHNSON FARE BOX COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK

FARE COLLECTION APPARATUS

Application filed November 18, 1931. Serial No. 575,709.

This invention relates to fare collecting apparatus particularly adaptable for use in fare collection systems in which coins or tokens are deposited at points remote from a receiver to be impacted for projection thereof through fixed paths from the point of deposit to the receiver, as for example in the fare collection system disclosed in my co-pending application Serial No. 551,840, filed July 20, 1931.

An important object of the invention is to produce a unitary depository structure supporting and enclosing the deposited coin or token receiving and supporting mechanism, the pneumatically operated impact mechanism, and the valve structure for controlling the flow of air to the impact mechanism.

A further object is to provide a unitary depository structure in which the valve controlling the air flow to the impact mechanism is operated by electromagnetic means within and forming part of the unitary structure.

Another object is to provide an arrangement in which the air pressure tends to hold the controlling valve in position, to shut off the air flow to the impact mechanism and in which the valve is withdrawn from its seat by the operation of an electromagnetic structure forming part of the unitary structure.

A further object is to provide an arrangement in which the coin or token receiving and supporting mechanism, the impact mechanism, the valve mechanism, and the electromagnetic valve controlling mechanism are all concentrically arranged and secured within a tubular housing which may be readily installed as part of a fare collection system.

The above specifically referred to, and other important features of the invention, are incorporated in the structure shown on the drawings, in which drawings

Figure 1 is a side elevation of a stanchion structure in which my improved unitary depository structure is inserted, together with a coin or token receiver and interconnecting guideways;

Figure 2 is an enlarged section on plane II—II of Figure 1;

Figure 3 is an enlarged section on plane III—III of Figure 1 showing the air flow controlling valve closed;

Figure 4 is a sectional view similar to that of Figure 3 but showing the valve opened;

Figure 5 is an enlarged section on plane V—V of Figure 6;

Figure 6 is a section on plane VI—VI of Figure 5;

Figure 7 is an enlarged section similar to Figure 3 for showing more clearly the valve arrangement;

Figure 8 is a section on plane VIII—VIII of Figure 7;

Figure 9 is a section through the valve and its supporting means, taken on plane IX—IX of Figure 8;

Figure 10 is a front elevation of the deposited coin or token receiving mechanism and showing also the circuit controlled by deposited coins or tokens; and

Figure 11 is a side elevation of the coin or token receiving structure with the outer contact plate removed.

Referring to Figure 1 I have shown a tubular stanchion 1 of which a number may be located at various points remote from a receiver structure R, with a chute or coin guideway 2 extending from the upper end of each stanchion to one of the receiving compartments 3 in the receiver structure, one of my improved depository structures D being included as part of each stanchion. For example the arrangement shown may represent the arrangement in a fare collection system for vehicles as disclosed in my co-pending application hereinbefore referred to, the coins or tokens deposited at the depository structures being projected therefrom to travel through the chute 2 to the receiver structure for inspection and collection.

The depository structure D comprises a tubular cylindrical housing formed of the two similar halves 4 and 4′ secured together by screws or bolts 5 extending through ears or lugs 6 formed on the halves. At its lower end the depository housing receives the lower end of the stanchion 1 which engages at its upper end against the internal shoulder 7 formed in the housing, while at its upper end the housing receives the upper part of the stanchion which engages against the internal annular shoulder 8 formed in the housing, the stanchion at its lower end seating in a base 9 secured to the floor 10 or other support.

In the arrangement shown, two coin guides or chutes 2 extend from the stanchion, the tubes being of rectangular cross-section and

being anchored at the top of the stanchion by a block 11.

Within the depository housing below the upper shoulder 8 therein is the coin or token receiving structure comprising the frame 12 which is rectangular and terminates at its upper and lower ends in cylindrical heads 13 and 14 which fit the inside of the depository housing, the head 13 fitting up against the shoulder 8 and screws 15 extending through the housing wall into the ears 16 of the lower head 14 whereby the frame 10 is securely held within the housing. The frame has the rectangular bore 17 extending longitudinally therethrough through which extends the partition structure 18 dividing the bore into parallel coin passageways 19 and 19′ which register with the coin chutes 2 and 2′ extending downwardly a distance into the head 13.

In alignment with the upper part of the frame 12 the depository housing has the lateral extension 20 having the coin insert slots 21 and 21′ separated by a partition wall 22, these slots 21 and 21′ being in alignment with the passageways 19 and 19′ through the frame 12 and communicating with these passageways through slots 23 and 23′ cut through the frame wall, as clearly shown in Figures 2 and 10. These slots 21 and 21′ slope downwardly so that any coin or token deposited therein will roll down through the slots 23 and 23′ and into the passageways 19 and 19′. The partition 22 guides the passenger or other person in depositing the coin or token and the partition may have the hole 24 therethrough affording clearance space for the fingers so as to facilitate deposit of a coin.

Near the lower end of the frame 12 pins 25 and 26 extend from one side of the frame 12 into the opposite side of the bore 17 therethrough below and across the coin passageway 19, while another set of pins 27 and 28 extend from the opposite side of the frame into the passageway 19′, so that coins passing through the passageways will be stopped by the pins. The horizontal distance between the pins is less than the diameter of the coins or tokens so that the coins or tokens will rest on the pins without wedging. The deposited coins are impacted by impact mechanism, as will be fully described hereinafter, to have momentum imparted thereto for their projection upwardly through the passageways 19 and 19′ and through the chutes 2 to the receiver structure R.

The impact mechanism is within the depository housing below the coin receiving mechanism. It comprises a cylinder 29 having the lower head 30 and being threaded at its upper end to receive the upper head 30′, these heads fitting the bore of the depository housing and the lower head resting on the shoulder 7. Extending axially through the cylinder 29 is the air tube 31 secured at its lower end to the head 30 and having this lower end contracted to form the conical valve seat 32. Telescoping the air tube is the tubular piston plunger stem 33 having the impact head 34 which is faced by a pad 35 which may be of comparatively soft metal, leather, rubber, or other suitable impact materials. When air under pressure is admitted into the tube 31 the piston structure is projected upwardly and the head 34 thereof enters the enlarged space 36 in the coin receiving frame 12 below the coin passageways 19 and 19′ so that coins resting on the pins 25, 26 or 27, 28 are violently struck and momentum imparted thereto to carry them through the chutes 2 to the receiver R. To limit the upward movement of the piston structure, a bumper ring 37 of cushioning material is seated in the head 30′ for engagement by the annular stop shoulder 38 on the piston stem 33. The return movement of the piston structure is cushioned by the engagement with the flange 39 at the lower end of the piston stem with the cushioning washer 40 at the lower end of the bore of the cylinder 29.

I preferably provide electromagnetic means for operating a valve for controlling the flow of air into the air tube 31. Depending from the head 30 is the cylindrical sleeve 41 which receives a tube 42, the tube being secured at its upper end in the sleeve and at its lower end being threaded to receive a fitting 43. Between this fitting and the sleeve 44 an energizing coil 44 is secured and the diameter of the fitting and of the coil is such that the fitting and coil will be received by the lower part of the stanchion 1 when the depository housing is mounted thereon, as clearly shown in Figures 3 and 4.

The tube 42 is preferably of non-magnetic material, such as brass, and slidable therein is the tubular armature or core 45 within which is secured the sleeve 46, the core and sleeve being of magnetic material, such as soft iron. As best shown in Figures 7, 8 and 9, the armature tube has the head 47 having the axial passageway 48 for the valve 49 whose upper end is of conical shape to fit the valve seat 32 at the lower end of the air tube 31. The valve has the base 50 at its lower end which is of a length to extend across the inside of the armature tube above the bushing 46, but of a width to be less than the diameter of the bushing, the bushing terminating a distance below the valve guide head 47 so that the movement of the valve is limited by the engagement of the base 50 with the bottom of the head 47 and the top of the bushing. Above the upper end of the bushing the armature tube is cut away at opposite sides as clearly shown in Figure 8, so as to leave passageways 51 between the interior of the bushing 46 and the space between the armature head and the lower end of the air tube 31.

The fitting 43 has the right angle passageway 52 therethrough the horizontal leg of

which registers with the opening 53 in the wall of the stanchion 1 so as to permit the securing of the end of a pipe 54 in the bore end, this pipe being connected with a source of compressed air (not shown).

Seated in the fitting 43 in alignment with the vertical part of the bore 52 is the thimble or bushing 55 which fits in the lower end of the sleeve 42, this thimble being of the same magnetic material as the armature tube 45. The thimble has the passageway 56 in its lower wall communicating with the bore 52 of the fitting and seated in the thimble is a compression spring 57 which extends into the lower end of the armature tube 45 to abut against the lower end of the bushing 46 forming part of the armature, the spring tending to hold the armature structure in upper position with the upper end of the bushing 46 against the valve base 50 to hold the valve head to the seat 32, and with the gap 58 between the lower end of the armature and the thimble 55. The closed position of the valve is shown in Figure 3, and the air pressure against the valve normally assists the spring 57 in holding the valve in closed position, the compressed air being within the armature below the valve base 50 and in the space 51 above the valve base when the valve is closed, the upward pressure against the valve structure being in excess of the downward pressure so that the air pressure will tend to hold the valve closed. Upon proper current flow through the electromagnet coil 44, the armature will be pulled downwardly against the pressure of the spring 57 but before the head 47 of the armature strikes the valve base, the air pressure will hold the valve closed. When the armature head strikes the valve base, the valve will be withdrawn from the valve seat 32 for the flow of compressed air into the tube 31 and upward flow of the piston 33 for impact of the piston head 34 with the deposited coin. The primary movement of the armature independently of the valve movement is to permit the armature to acquire sufficient momentum so that when it finally strikes the valve base the valve will be easily and quickly opened against the pressure of air. Upon energizing current flow through the coil 44 the armature will tend to close the gap 58 and the armature finally strikes the thimble 55, the blow being cushioned by means of a washer 59 interposed between the lower end of the thimble 55 and the fitting 43. The open position of the valve is shown in Figure 4, it being held open by the attracted armature. Upon opening of the energizing circuit the spring 57 restores the armature to its upper position, the bushing 46 engaging the valve base to lift the valve into engagement with the seat 32 so as to close the air tube 31 to the compressed air, which, upon closing of the valve, will act against the valve to assist in holding the valve in closed position.

The circuit for the electromagnetic valve operating means is preferably automatically controlled by the deposited coins or tokens. The circuit controlling means is arranged on the coin or token receiving frame 12 in the path of coins or tokens inserted therein. Referring particularly to Figures 5, 6, 10 and 11, on opposite sides of the frame 12 between the heads 13 and 14 thereof are the insulating frames 60 and 60′, insulating plates 61 being interposed between each of the plates and the frames 12 and each of the plates being undercut to leave a space 62, the plates and insulating layers being secured by means of screws 63. Within the space 62 of the plate 60 is a U-shaped contact supporting plate 64 whose legs extend downwardly and have secured at their lower ends inwardly extending contacts 66 and 66′ which project through passageways 67 and 67′ through the insulating plate 61 and the adjacent wall of the frame 12 and into the coin passageway 19 through the frame 12 a short distance above the heads 25 and 26. The contact plate 64 is of elastic material, such as sheet, copper or brass and a compression spring 68 interposed between the top of the contact plate and the insulating plate 60 tends to hold the contact plate with its contacts 66 and 66′ projected a distance into the channel 19 as clearly shown in Figure 6. A similar contact plate 64′ is located within the space 62 of the insulating plate 60′ and at its lower end carries the contacts 66 and 66′ projecting through the passageways 67—67′ into the coin channel 19′ above the pins 27 and 28.

The partition wall 18 between the channels 19 and 19′ supports contact buttons 69 and 69′ extending at one end into the channel 19 opposite the contact points 66 and 66′ in the insulating plate 60 and at their other end extending into the channel 19′ opposite the contact points 66 and 66′ in the insulating plate 60′. When there are no coins in the coin channels, the contact points 66 and 66′ will extend the full distance into the channels but never far enough to engage the contact buttons 69 and 69′. The opposed surfaces of the contact points and buttons are beveled as clearly shown in Figure 6 and when a coin is inserted and dropped thru one of the channels in the frame 12, it will engage the beveled surfaces to force the spring supported contact points outwardly and to be held by the spring pressure into firm electrical contact with the points and buttons, the coin eventually coming to rest against the respective pins to electrically connect the contact points with the buttons.

The contact buttons 69 and 69′ are in electrical engagement with the partition wall 18 and thereby with the metal framework of the depository structure, while the contact points 66 and 66′ are connected with an electrical circuit. Referring to Figures 10

and 11, a terminal bar 70 is secured to one of the insulating plates 60 or 60′, the drawings showing the bar secured to the plate 60′. Between the contact plate 64 and the insulating layer 61 is interposed a conductor plate 71 which is of T-shape, its base being secured by the screws or rivets 72 which secure the contact plate 64 to the insulating layer 61, the stem of the conductor plate extending downwardly between the legs of the contact plate. A similar conductor plate 71′ is placed below the contact plate 64 in the insulating plate 60. A source of current, such as a battery B, has one terminal connected by a conductor 73 with the metal framework of the depository structure while the other terminal of the battery is connected with one terminal of the electromagnet coil 44 whose other terminal is connected by conductor 74 with the terminal plate 70. This terminal plate is connected by conductor 75 with the lower end of the conductor plate 71 and the lower ends of the conductor plates 71 and 71′ being connected together by a conductor 76. Thus when a coin is inserted and dropped in one of the coin passageways through the frame 12 into engagement with the contact points and buttons, the circuit will be closed from the battery through the electromagnet winding, the terminal plate 70, the conductor 75, the conductor plates 71, 71′, the terminal plates 64 and 64′, the contact buttons 66—66′, and through the deposited coin to the contact buttons 69—69′ and through the metal framework back to the battery, and the electromagnet armature will be drawn down to remove the valve 49 from the seat 32 for the flow of compressed air for projecting the piston 33 upwardly to impact the deposited coin and to project it through the guide passageways and chute to the corresponding compartment 3 of the receiver R. As soon as the coin has been projected, the circuit will be opened and the electromagnet will be deenergized and the armature structure will move back to normal position to reclose the valve. If coins are simultaneously deposited in the insert slots 21—21′ they will be simultaneously projected through the channels 19 and 19′ and through the respective chutes to the respective compartments of the receiver R.

I thus produce a simple, compact, unitary depository structure which houses the coin insert mechanism, the coin impact mechanism, and the air flow controlling valve mechanism, and which can be readily interposed in stanchion structures or otherwise installed in fare collection or coin receiving systems.

I have shown a practical and efficient embodiment of the various features of my invention, but I do not desire to be limited to the details thereof as changes and modifications may be made in construction, arrangement and operation without departing from the scope and spirit of the invention as outlined in the appended claims.

I claim as my invention:

1. A unitary depository structure for fare collection system comprising a tubular housing having a coin insert slot, coin receiving means within said housing registering with said insert slot to receive and support a deposited coin, pneumatically operated impact mechanism within said housing below said receiving mechanism comprising an impact member for striking deposited coins to project them from said receiving mechanism, a valve for controlling the air flow to said impact mechanism, said valve being within said housing below said impact mechanism, and electromagnetically operated means within said housing below said valve for controlling the operation of said valve.

2. A unitary depository structure for fare collection systems comprising a tubular housing having a coin insert slot, coin receiving means within said housing registering with said insert slot to receive and support a deposited coin, pneumatically operated impact mechanism within said housing below said receiving mechanism comprising an impact member for striking deposited coins to project them from said receiving mechanism, a valve for controlling the air flow to said impact mechanism, said valve being within said housing below said impact mechanism, electromagnetically operated means within said housing below said valve for controlling the operation of said valve, and an electrical circuit for said electromagnetic means automatically controlled by the coins deposited in said receiving mechanism.

3. In fare collection apparatus, the combination of a housing having a coin insert slot, receiving mechanism within said housing for receiving and supporting a deposited coin, an air tube below said receiving mechanism terminating at its lower end in a valve seat, a tubular stem telescoping said air tube and having an impact head at its upper end in alignment with deposited coins whereby compressed air flowing into said tube will project said stem to impact said head with a deposited coin to impart momentum to the coin for projection thereof from said receiving mechanism, and a valve cooperating with said valve seat to control the flow of air to said tube.

4. In fare collection apparatus, the combination of a housing having a coin insert slot, receiving mechanism within said housing for receiving and supporting a deposited coin, an air tube below said receiving mechanism terminating at its lower end in a valve seat, a tubular stem telescoping said air tube and having an impact head at its upper end in alignment with deposited coins whereby compressed air flowing into said tube will project said stem to impact said head with

a deposited coin to impart momentum to the coin for projection thereof from said receiving mechanism, a valve cooperating with said valve seat to control the flow of air to said tube, and electromagnetic means within said housing for controlling said valve.

5. In fare collection apparatus, the combination of a housing having a coin insert slot, receiving mechanism within said housing for receiving and supporting a deposited coin, an air tube below said receiving mechanism terminating at its lower end in a valve seat, a tubular stem telescoping said air tube and having an impact head at its upper end in alignment with deposited coins whereby compressed air flowing into said tube will project said stem to impact said head with a deposited coin to impart momentum to the coin for projection thereof from said receiving mechanism, and a valve cooperating with said valve seat to control the flow of air to said tube, electromagnetic means within said housing for controlling said valve, and a circuit for said electromagnetic means automatically controlled by a coin deposited in said receiving mechanism.

6. In a fare deposit and projecting structure, the combination of a housing having a coin insert slot, receiving means within said housing for receiving and supporting a deposited coin, impact mechanism within said housing below said receiving mechanism comprising a cylinder and a piston, means for conducting compressed air to said piston to cause movement thereof from said cylinder into impact engagement with a deposited coin for imparting momentum to the coin to project it from said receiving mechanism, a valve controlling the flow of air to said cylinder, the air pressure tending to hold said valve closed, an electromagnetic coil within said housing and a plunger therefor, said plunger being normally disconnected from said valve and adapted upon energization of said coil to strike said valve to cause opening thereof, and a circuit for controlling the operation of said electromagnet.

7. In a fare deposit and projecting structure, the combination of a housing having a coin insert slot, receiving means within said housing for receiving and supporting a deposited coin, impact mechanism within said housing below said receiving mechanism comprising a cylinder and a piston, means for conducting compressed air to said piston to cause movement thereof from said cylinder into impact engagement with a deposited coin for imparting momentum to the coin to project it from said receiving mechanism, a valve controlling the flow of air to said cylinder, the air pressure tending to hold said valve closed, an electromagnetic coil within said housing and a plunger therefor, said plunger being normally disconnected from said valve, and adapted upon energization of said coil to strike said valve to cause opening thereof, and a circuit for said electromagnet automatically controlled by a deposited coin.

8. In a fare deposit and projection structure, the combination of a housing having an insert slot for coins, receiving mechanism within said housing having a passageway for receiving a deposited coin and a support in said passageway for the coin, impact mechanism within said housing below said receiving mechanism and comprising a cylinder and a piston, said cylinder having an air inlet at its lower end surrounded by a valve seat, an electromagnet below said impact mechanism comprising an energizing coil and a tubular plunger, a valve reciprocable in said plunger for cooperation with said valve seat, means tending to normally hold said plunger against said valve to hold the valve in closed position, an inlet for compressed air at the lower end of said housing, compressed air being conducted through said plunger for delivery to the cylinder when said valve is open and the air pressure tending to hold said valve closed, and an energizing circuit for said coil, and means whereby when said coil is energized said plunger will be shifted to be first released from said valve and then engaged with said valve to move it into open position against the air pressure, flow of air into said cylinder causing movement of its piston into impact engagement with a deposited coin to impart momentum to the coin for projection thereof from said receiving mechanism.

9. In a fare deposit and projection structure, the combination of a housing having an insert slot for coins, receiving mechanism within said housing having a passageway for receiving a deposited coin and a support in said passageway for the coin, impact mechanism within said housing below said receiving mechanism and comprising a cylinder and a piston, said cylinder having an air inlet at its lower end surrounded by a valve seat, an electromagnet below said impact mechanism comprising an energizing coil and a tubular plunger, a valve reciprocable in said plunger for cooperation with said valve seat, means tending to normally hold said plunger against said valve to hold the valve in closed position, an inlet for compressed air at the lower end of said housing, compressed air being conducted through said plunger for delivery to the cylinder when said valve is open and the air pressure tending to hold said valve closed, an energizing circuit for said coil, means whereby when said coil is energized said plunger will be shifted to be first released from said valve and then engaged with said valve to move it into open position against the air pressure, flow of air into said cylinder causing movement of its piston into impact engagement with a deposited coin to impart mo-

mentum to the coin for projection thereof from said receiving mechanism, and contacts on said receiving mechanism engaged by a deposited coin to automatically close the energizing circuit for said coil.

10. In a depository structure for fare collection systems, the combination of a housing having a coin insert slot, receiving mechanism within said housing having a passageway therethrough for receiving a deposited coin, an air tube within said housing below said passageway terminating at its lower end in a valve seat, a piston stem telescoping said air tube and having a head at its upper end, an electromagnet within said housing below said air tube comprising an energizing coil and a plunger therefor in axial alignment with said air tube, a valve carried by said plunger for cooperating with said valve seat, an inlet at the lower end of said housing for compressed air, means normally holding said plunger to cause said valve to be closed, and an energizing circuit for said coil, energization of said coil causing said plunger to be shifted to open said valve for the flow of compressed air through said tube and upward movement of said piston, said piston striking a deposited coin to impart momentum thereto to cause ejection thereof from said receiving mechanism.

11. In depository structure for fare collection systems the combination of an enclosing housing of tubular form having a coin insert slot, receiving mechanism within said housing having a passageway for receiving a deposited coin, fluid pressure operated impact mechanism within said housing below said receiving mechanism comprising a movable impact member for impact engagement with a deposited coin to impart momentum thereto for projection thereof from said receiving mechanism, a valve for controlling the flow of fluid to said impact mechanism, and electromagnetic means entirely within said housing below said impact mechanism for controlling the operation of said valve.

12. In depository structure for fare collection systems the combination of an enclosing housing of tubular form having a coin insert slot, receiving mechanism within said housing having a passageway for receiving a deposited coin, fluid pressure operated impact mechanism within said housing below said receiving mechanism comprising a movable impact member for impact engagement with a deposited coin to impart momentum thereto for projection thereof from said receiving mechanism, a valve for controlling the flow of fluid to said impact mechanism, electromagnetic means entirely within said housing below said impact mechanism for controlling the operation of said valve, and a circuit for said electromagnetic mechanism automatically controlled by a coin deposited in said receiving mechanism.

13. In a depository structure for installation in fare collection systems, the combination of a tubular housing, receiving mechanism within said housing having a passageway for receiving a deposited coin, fluid pressure operated impact mechanism within said housing below said receiving mechanism comprising a movable impact member for striking a deposited coin to impart momentum thereto for ejection thereof from said receiving mechanism, a valve within said housing for controlling the flow of fluid to said impact mechanism, electromagnet mechanism entirely within said housing below said impact mechanism and comprising a plunger and an energizing coil therefor, said plunger normally engaging said valve to hold it in closed position and being adapted upon current flow through said energizing coil to be shifted to move the valve to open position for the flow of fluid to said impact mechanism, a circuit for said coil, and terminals for said circuit in said receiving mechanism passageway for engagement by a deposited coin to close the circuit.

14. In fare collection apparatus, the combination with a housing having a coin insert slot, receiving mechanism within said housing for receiving and supporting a deposited coin, an air tube below said receiving mechanism, a tubular stem telescoping said air tube and having an impact head at its upper end in alignment with deposited coins whereby compressed air flowing into said tube will project said stem to impact said head with the deposited coin to impart momentum to the coin for projection thereof from said receiving mechanism, and means controlled by a deposited coin for controlling the flow of compressed air to said tube.

15. In fare collection apparatus, the combination of a housing having a coin insert slot, receiving mechanism within said housing for receiving and supporting a deposited coin, impact mechanism operable by compressed air for impacting a deposited coin for projection thereof from said receiving mechanism, a valve controlling the flow of air through said impact mechanism, an electromagnet having an armature provided with two abutments, a circuit for said electromagnet controlled by a deposited coin, one of said armature abutments engaging said valve to hold it closed before a coin is deposited and said other abutment serving to engage the valve to open it when a coin is deposited and the electromagnet circuit is closed.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

ERNEST H. THOMPSON.