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REGISTER OPERATING DEVICE

Filed March 30, 1923

2 Sheets-Sheet 1

FIG. 1.

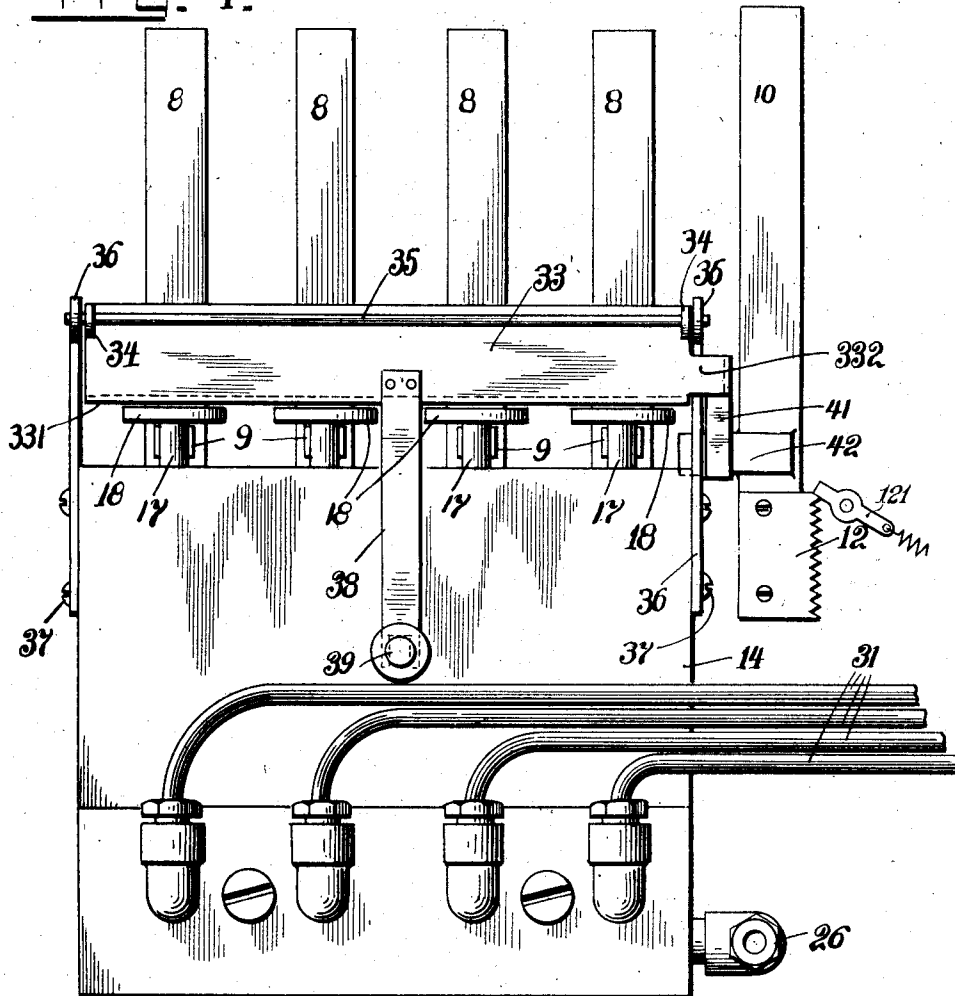
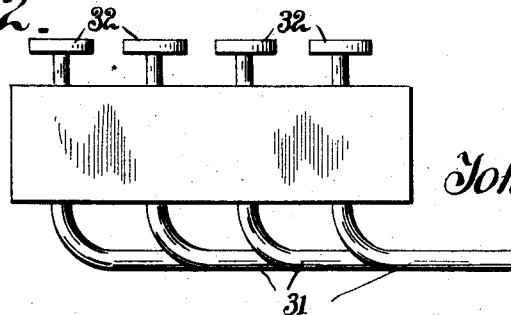


FIG. 2.



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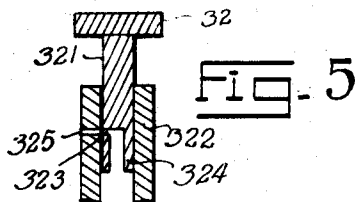
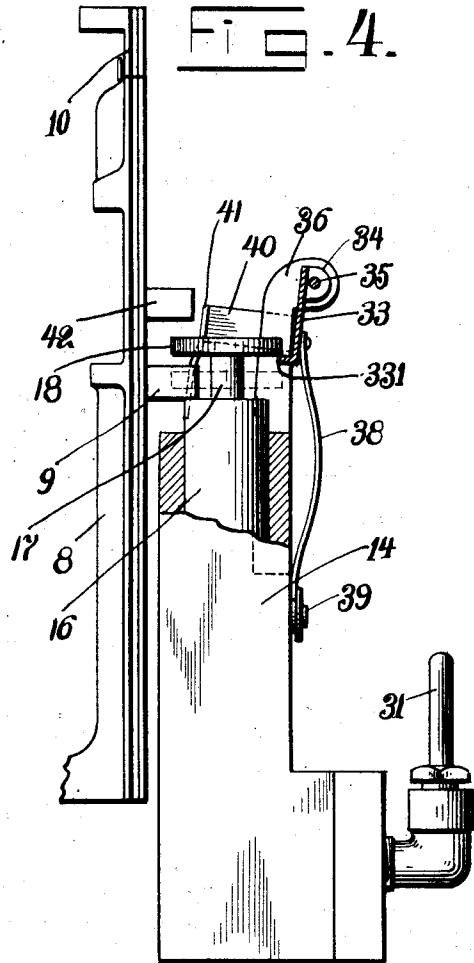
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REGISTER OPERATING DEVICE

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Fig. 4.



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## UNITED STATES PATENT OFFICE.

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## REGISTER-OPERATING DEVICE.

Application filed March 30, 1923. Serial No. 628,786.

This invention relates to a register operating device, and is shown as applied to fare registers of the type described in the patents Ohmer et al. 694,322, February 25, 1902, and Ohmer et al. 715,129, December 2, 1902. 5

These patents describe a fare register containing a plurality of printing counters, each of which is adapted to register and print the number of fares of a certain class which are received. The machine also contains indicators for indicating the amount of the fare which has been registered, that is, the particular fare counter which has been actuated; and a master indicating 10 counter designed to indicate the total number of fares of all classes which have been collected since the said counter has been reset. In this machine the counter to be actuated was first selected by the conductor, then said counter was actuated through operations carried out by the actuation of a separate device. 15

One object of the present invention is to provide pneumatic means for operating such a register as shown in the patent cited. 25 A further object of the invention is to provide a pneumatic device associated with each of the several units or counters of the fare register and adapted to actuate said unit through a member already in use in the register and without any alteration of the register proper whatever. 30

A further object of the invention is to provide means whereby the selecting of the register to be actuated and the actual registering operation are carried out by the conductor as one and the same operation. 35

A further object of the invention is to provide, in a pneumatic register operating device, means by which the relief of the pressure in one part of the pneumatic system effects operation of the register. 40

A further object of the invention is to provide means associated with the register whereby any pneumatic device which has been displaced from initial position cannot be restored to initial position until the actuation of the register is completed. 45

A further object of the invention is to provide pneumatic means for actuating 50

several units of a multiple unit register, and means whereby when any pneumatic device is displaced, all others are locked in initial position until the device displaced is restored to initial position. 55

A further object of the invention is to provide, in a register actuating device, a balanced fluid pressure actuated valve and means under the control of the conductor, a single operation of which displaces said valve and restores it to its initial position. 60

In the drawings:

Figure 1 represents a rear elevation of a register operating device according to my invention applied to a four unit register, that is, a register adapted to receive and register separately four different classes of fares. 65

Figure 2 is a diagrammatical showing of the conductor's valve. 70

Figure 3 is a section through an operating cylinder and its valve chest, the register actuating slides being broken away to show the piston locking device. 75

Figure 4 is an end elevation partly in section showing the piston locking device in effective position. 80

Figure 5 is an enlarged detail showing a pressure reducing valve in actuated position. 85

The several counters or units of the register are actuated by means of slides 8, each of which has integral therewith a lug 9 through which the slide is operated in the manner to be hereinafter described. The way in which movement of these slides actuates the register is fully described in Patent 694,322 and forms no part of the present invention. 90

By means (not shown) and contained within the register, the displacement of any slide 8 also displaces the universal slide 10, one function of which is to insure the restoration of the actuated slide 8 to initial position. For this purpose a stout spring 11 is provided. The universal slide 10 is provided with a full stroke ratchet 12 cooperating with a full stroke pawl 121. 95

The pneumatic devices by which the slides 8 are actuated are contained within the cyl- 100

inder block indicated generally by 14. This block contains cylinder bores 15 associated with each of the slides 8. Each bore 15 contains a piston which is reduced near its upper end as shown at 17, and terminates in a head 18. The lug 9 on each of the actuating slides 8 is embraced between parts 18 and 16 of the piston associated therewith, as shown in Figures 3 and 4. A valve chest 19 is associated with each cylinder 15 and connected therewith by bore 20 and passage 21. Partly within each valve chest proper, and partly within the associated bore 20 is a compound balanced valve adapted to be actuated by difference in the pressures to which its faces are exposed. Each balanced valve comprises a head 22 in peripheral contact with the cylindrical wall of its valve chest 19, a valve portion 23 seating against the end of valve chest 19, and a short shank 24 connecting the parts mentioned with a head 25 which is in peripheral contact with the bore 20.

Compressed air or other fluid is supplied to the apparatus through a tube connected at 26 (Fig. 1) with the passage 27 (Fig. 3), which passage is in communication with each valve chest 19 at the side of head 22 adjacent to the passages leading to cylinders 15. It will be seen that valve 23 with bore 20 forms an intake port for admitting air to cylinder 15, which port will be opened when the balanced valve is displaced to the right, from the position shown in Figure 3. The exhaust port for cylinder 15 is furnished by passage 28. This port is shown open in Figure 3 and will be closed by head 25 when the balanced valve is displaced to the right. Thus the register will be actuated by the elevation of piston 16, and such piston and the parts moved thereby will be restored to normal position, when the balanced valve is first displaced to the right and then restored to the position shown in Figure 3. For the purpose of effecting this operation, the following devices are provided.

A small opening 30 through operating head 22 of the balanced valve admits air to the end of valve chest 19 opposite its connection to the cylinder, and to the source of air supply. This end of the valve chest is connected by tube 31 to keys or push buttons 32 operated by the conductor, it being remembered that there is one such valve for each class of fares to be registered. The depression of each push button 32 effects a reduction of pressure in the tube 31 associated therewith. These push button valves may take a variety of forms; the particular form selected for purpose of illustration (Fig. 5) comprises a counterbored stem which fits into an opening in the block 322. When the push button is depressed a lateral perforation 323 in the wall of the counter-

bore 324 registers with an opening 325 in the block 322, thus permitting the escape of air from the tube 31, and reducing the pressure therein. This reduction of pressure will cause the balanced valve to move to the right, opening the intake port 20 and closing the exhaust port 28, thus actuating piston 16. The release of the button 32 closes the valve which its depression opened and the pressure in tube 31 and the end of valve chest 19 adjacent thereto is quickly restored by the passage of air through the small opening 30. The end of head 25 opposite the valve chest is exposed to atmospheric pressure by opening 255 (Fig. 3) through the wall of cylinder block 14. The end of head 25 adjacent the valve chest 19 is at this time exposed to the pressure of the compressed air within said valve chest and within cylinder 15. Thus the pressures on the right hand faces of the compound valve are greater than on its left hand faces and said valve is accordingly moved to the left, closing intake port 20 and opening exhaust port 28. The piston 16 is then restored to initial position by its own weight assisted by the tension of spring 11.

Devices are provided for insuring that a second piston cannot be elevated from its initial position after any piston has been displaced and prior to its return to initial position. Devices are also provided for insuring that a slide 8, which has been displaced by its piston, must execute a full forward stroke before such piston can be restored to its initial position. To this end a locking bar 33, comprising a horizontally extending flange 331 is pivotally supported by ears 34 integral therewith on a rod extending through said ears and through the upper ends of arms 36 attached by screws 37 to the cylinder block 14. The locking plate 33 is pressed toward the path of movement of the pistons by spring 38 attached thereto and engaging a stud 39 on the cylinder block. Movement of plate 33 toward the pistons is limited by the engagement of reduced end 332 with one of the arms 36. Attached to, or integral with the plate 33, is an arm 40 having a downwardly extending cam engaging portion 41. The universal slide 10 is provided with a lug or cam 42 which, when the slide is in its initial position, engages the arm 41 and retains locking plate 33 out of the path of the piston against the tension of its spring 38. It will be recalled that universal slide 10 is displaced with any of the individual slides 8, so that upon the displacement of any slide by its piston, the flange 331 swings beneath the displaced piston and above the remaining pistons, thus blocking the remaining pistons against movement until the flange 331 is withdrawn by the return of universal slide 10 to its initial position. The full stroke

device 12 prevents the return of universal slide 10 until such slide has completed a full forward stroke. Thus, any incomplete actuation of any unit of the register is prevented, and any displaced piston is prevented by flange 331 from returning to normal position until its slide 8, and consequently the universal slide 10, has performed a full forward stroke.

10 The operation of the device may be summarized as follows: The depression by the conductor of any valve 32, reduces the pressure on the right hand side (Fig. 3) of valve head 22 thus displacing the compound valve and admitting air to cylinder 15. The piston 16 thus displaced actuates the desired unit of the register through its engagement with lug 9 on slide 8. Upon the release of the button depressed by the conductor, air passing through opening 30 equalizes the pressure on opposite sides of valve head 22 and the difference in pressure on opposite sides of head 25 moves the balanced valve to the left in Figure 3 thus closing the intake and opening the exhaust from cylinder 15 and restoring the displaced piston to initial position. Incomplete actuation of any unit of the register or displacement of any second piston after one piston has been actuated, is prevented by means of locking bar 33 which is under control of cam 42 on universal slide 10, which slide is caused by means within the register to move within any of the slides 8.

35 The invention is not to be considered as limited to the specific embodiments shown in the drawings and herein fully described, but is to be considered as extending to any modifications thereof which fall within the scope of the appended claims.

I claim:

1. Fluid pressure actuating means for a register comprising a balanced valve actuated by relief of the pressure in a part of the fluid pressure system.

2. A register operating device comprising pneumatic means adapted to engage a part of said register, a balanced valve for connecting said pneumatic means to a source of fluid supply and a manually actuated device for controlling said balanced valve.

3. A register operating device comprising fluid operated means adapted to engage a part of said register, means for connecting said fluid operated means to a source of fluid supply, a manually actuated pressure reducing valve, and means whereby actuation of said valve controls said connecting means.

4. A register operating device comprising fluid operated means adapted to engage said register, a source of fluid supply, a balanced valve normally closing said fluid operated means from said source of fluid supply, a chamber containing said balanced valve in

communication with said source of fluid supply, a tube connected to said chamber, and means for relieving the pressure in said tube, whereby said balanced valve is displaced to connect said fluid operated means with said source of fluid supply.

5. A register operating device comprising a piston adapted to engage and actuate a part of said register, a cylinder containing said piston, a normally open exhaust port for said cylinder, a normally closed intake port for said cylinder; a valve comprising a cylindrical portion adapted to close said exhaust port, a disc portion normally closing said intake port, and a circular head operable within a cylindrical chamber, a source of fluid supply in communication with said chamber, means tending to equalize the pressure on opposite sides of said head, and a relief valve for reducing pressure on one side of said head, thereby displacing said valve to close said exhaust port and open said intake port.

6. A register operating device comprising a piston adapted to engage and actuate a part of said register, a cylinder containing said piston, intake and exhaust ports for said cylinder, a fluid pressure operated valve for controlling said ports, and a manually operated valve for controlling the fluid pressure to operate said fluid pressure operated valve.

7. In a register operating device, an actuating piston, a cylinder therefor having an intake port and an exhaust port, a cylindrical valve chest, a source of fluid supply in communication with said valve chest near one end thereof, a fluid pressure operated valve in said valve chest having a part normally closing said intake port, a part adapted to close said exhaust port, and a head contacting with the cylindrical wall of said valve chest, a tube connected with the end of said valve chest opposite said connection to the source of fluid supply, a manually operated valve for opening this tube to the atmosphere thus reducing the pressure therein, whereby said fluid pressure operated valve is displaced to open said intake port and close said exhaust port, a small opening in said valve head adapted to equalize pressure on opposite sides of said head when said manually operated valve is closed, whereby pressure on said exhaust closing part moves said valve to normal position.

8. In a multiple unit register actuating mechanism comprising a fluid operated piston associated with each unit of the register, means effective on the initial movement of any piston for preventing movement of any other piston prior to the completion of the registering operation thus initiated, and the return of the parts displaced to normal position.

9. A multiple unit register actuating de-

vice comprising an operating slide for each unit of said register, a universal slide actuated on movement of any one of the operating slides, a fluid operated piston associated with each of said operating slides and effective to actuate the same, a movable bar effective in one position to prevent displacement of said pistons from initial position, and means effective on the initial displacement of said universal slide to move said bar into effective position.

10. In a multiple unit register actuating mechanism comprising a fluid pressure actuated device associated with each unit of said register, means comprising an element actuated by movement of each of said fluid pressure actuated devices for preventing displacement of any of said devices during the displacement of any other such device.

11. A register operating device comprising a manually controlled relief valve, and a fluid pressure operated valve adapted to be displaced on opening said relief valve and restored on closing said relief valve.

12. Means for actuating a register by fluid pressure comprising a cylindrical valve chest, a compound valve in said valve chest having an operating head, and two port closing sections, said valve being adapted to be displaced in one direction when opposite sides of said operating head are exposed to unequal pressure, and in the reverse direction when opposite sides of said head are exposed to equal pressure.

13. Means for actuating a register by fluid pressure comprising a cylindrical valve chest, a compound valve in said valve chest having an operating head, and two port closing sections, said valve being adapted to be displaced in one direction when opposite sides of said operating head are exposed to unequal pressure, and in the reverse direction when opposite sides of said head are exposed to equal pressure, a manually operated means for reducing the pressure on one side of said head, and automatic means for equalizing pressures on opposite sides of said head, effective on release of said manually operated means.

14. In a register operating device, in combination, a tube normally containing fluid under pressure, a valve adapted when depressed to relieve the pressure in said tube, and means whereby such relief of pressure actuates the register, said means comprising a fluid pressure operated valve, a cylinder having ports closed and opened by said valve, and a register actuating piston in said cylinder.

15. In a register operating device, in combination, a tube normally containing fluid under pressure, a valve adapted when depressed to relieve the pressure in said tube and means whereby such relief of pressure

actuates the register, said means comprising a cylinder containing a register actuating piston, and having intake and exhaust ports, a compound fluid pressure operated valve having a section normally closing said intake port, a second section adapted to close said exhaust port, and an operating head, a valve chest containing said operating head and connected on one side of said head to said tube and on the opposite side of said head to a source of fluid supply, whereby relief of pressure in said tube displaces said piston to close said exhaust port and open said intake port.

16. In a register operating device, in combination, a tube normally containing fluid under pressure, a pushbutton valve adapted when depressed to relieve the pressure in said tube and means whereby such relief of pressure actuates the register, said means comprising a cylinder containing a register actuating piston, and having intake and exhaust ports, a compound fluid pressure operated valve having a section normally closing said intake port, a second section adapted to close said exhaust port, and an operating head, a valve chest containing said operating head, and connected on one side of said head to said tube and on the opposite side of said head to a source of fluid supply, whereby relief of pressure in said tube displaces said piston to close said exhaust port and open said intake port, and means whereby releasing said pushbutton restores said compound valve to normal position.

17. In a register operating device, in combination, a tube normally containing fluid under pressure, a pushbutton valve adapted when depressed to relieve the pressure in said tube and means whereby such relief of pressure actuates the register, said means comprising a cylinder containing a register actuating piston, and having intake and exhaust ports and an operating head, a valve chest containing said operating head, and connected on one side of said head to said tube and on the opposite side of said head to a source of fluid supply, whereby relief of pressure in said tube displaces said piston to close said exhaust port and open said intake port, a small opening in said operating head permitting relatively slow passage of fluid therethru, whereby on releasing said pushbutton pressure is restored in said tube and said compound valve restored to normal position.

18. A multiple unit register actuating device comprising a fluid pressure piston associated with each unit of said register, a fluid pressure operated valve associated with each piston, a manually operated pressure relief valve associated with each fluid pressure operated valve, and a device for preventing displacement of any piston from

initial position by its actuating means while another piston is displaced from initial position.

19. A register operating device comprising, in combination a pressure actuated valve, a pushbutton valve for controlling pressure to actuate said pressure actuated valve, a cylinder having intake and exhaust

ports controlled by said pressure actuated valve, a piston within said cylinder, means whereby said piston actuates said register, and means for preventing return of said piston to initial position until the register has been completely actuated. 10

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