No. 641,520. Patented Jan. 16, 1900.

M. LAUX & A. L. VAUGHAN.

WATER CLOSET SYSTEM.

(Application filed Aug. 24, 1898.)

(No Model.) 2 Sheets—Sheet 1.

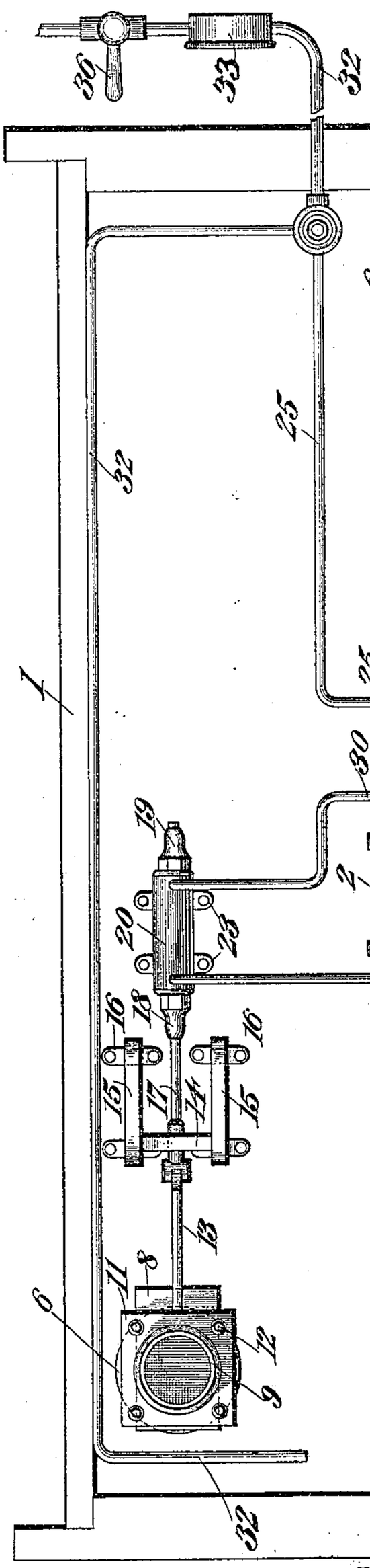

Fig. 1.

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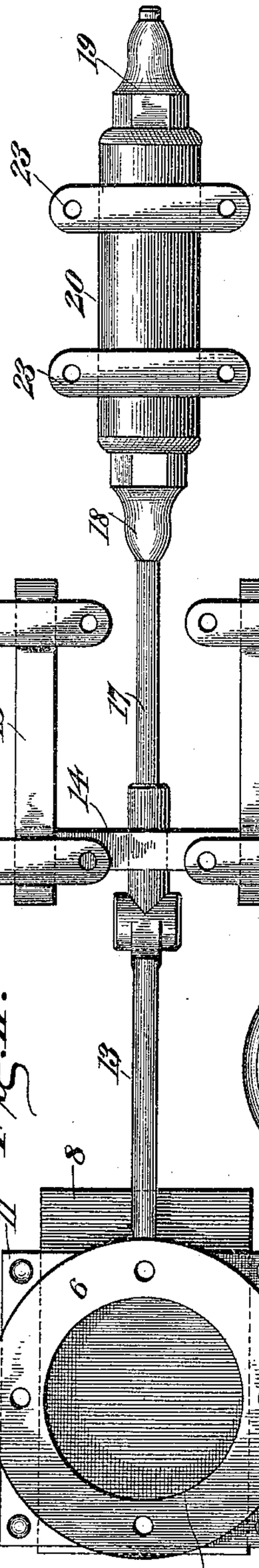

FIG. II.

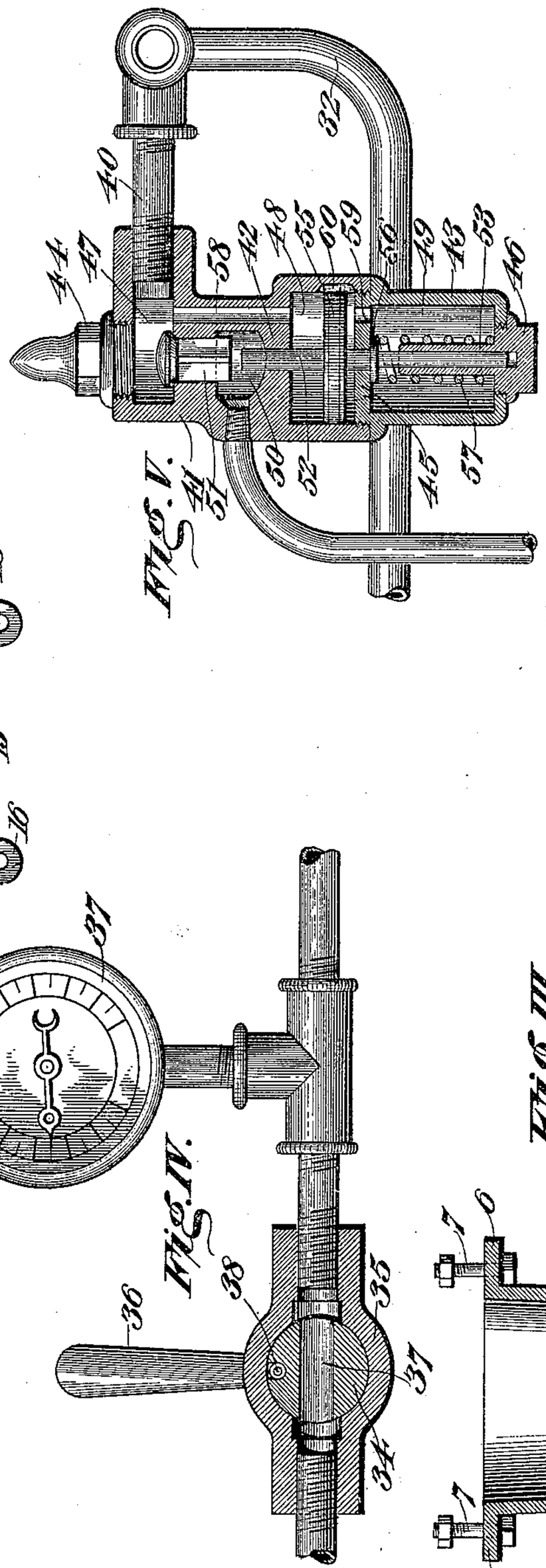

FIG. V.

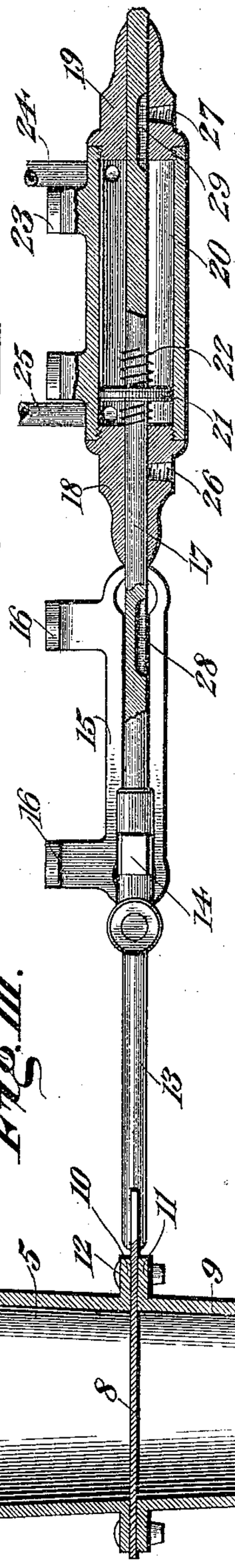

FIG. III.

FIG. IV.

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UNITED STATES PATENT OFFICE.

MATHIAS LAUX AND ALONZO L. VAUGHAN, OF LITTLE ROCK, ARKANSAS.

WATER-CLOSET SYSTEM.

SPECIFICATION forming part of Letters Patent No. 641,520, dated January 16, 1900.

Application filed August 24, 1898. Serial No. 689,447. (No model.)

To all whom it may concern:

Be it known that we, MATHIAS LAUX and ALONZO L. VAUGHAN, of Little Rock, in the county of Pulaski, State of Arkansas, have invented certain new and useful Improvements in Water-Closet Systems, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of our invention is to produce an improved water-closet apparatus especially adapted for use on railway-trains or the like, whereby all the closets on each car of a train are within the exclusive control of one operator—for example, the engineer of the train—so that he is enabled to discharge or dump all of the closets simultaneously when desirable and to prevent their being dumped at all other times.

As at present equipped railway-cars are each provided with one or more independent closets, whose dumping apparatus may be operated by any one using the closet. Consequently in order to prevent fouling of railway-stations necessity imposes the rule of locking all closets before the train approaches important stations, of keeping them locked while lying in the station, and of opening them only after the train leaves the station or yard. This rule not only occasions frequent inconvenience to passengers, but owing to the occasional negligence of employees of the road to perform their duties a closet is not unfrequently overlooked, and the purpose for which the rule is made fails of accomplishment. By the aid of our invention all the closets are available for use at all times; but the fouling of stations or yards may be positively prevented.

In accomplishing the object of our invention we propose for certain reasons to employ pneumatically-actuated closet-dumping mechanism. We employ mechanism of that description chiefly because all modern passenger-trains are equipped with air-brake and air-signal mechanism, whose energies may be readily utilized to perform the additional function imposed by the use of our apparatus without interfering in the least with their prime functions. Moreover, since it is often urged with good reason that the duties of an engineer already involve sufficient responsibility fully taxing his attention and therefore should be multiplied as little as possible, we prefer to so incorporate our apparatus with those pneumatically-actuated systems with which trains are already supplied and which are in every-day practice successfully operated as to impose the least possible additional duty upon the engineer or other trainman. That the above-suggested end can be conveniently accomplished may be readily apprehended when it is considered that the brakes of a train are applied upon approaching all stations. Consequently by utilizing the exhaust of the air-brake cylinders to close the closet systems the end we propose to accomplish may be reached by one manipulation and without possibility of interference with the brake system. By a single manipulation of a plug in the signal system the simultaneous dumping of the closet system may be accomplished. The manipulation of the dumping-plug above referred to may be made at any time at the convenience of the engineer or may be intrusted to his helper or another one on the train, if it be thought desirable.

The foregoing general description comprehends the broader outlines of our invention, whose details and narrower scope will hereinafter be fully described in the specification and succinctly set forth in the appended claims.

In the accompanying drawings, Figure I is a bottom plan view of a car-frame with our apparatus applied thereto in duplicate. Fig. II is a top plan view of the closet and its closing mechanism in position as applied to a car, but detached therefrom. Fig. III is a vertical section of the subject-matter of Fig. II. Fig. IV is a sectional view of dumping or pressure reduction plug inserted in signal-pipe line. Fig. V is a vertical central section, partially in elevation, of automatic release-valve.

Referring to the figures on the drawings, 1 indicates the frame of a car-body, 2 an air-cylinder of a brake system representing one source of fluid-pressure supply, and 3 fragments of its usual pipe connections. The brake system being incidentally related to our invention solely because it furnishes a convenient source of energy, and that only by preference, since another source of energy

would be equally serviceable, though not so expedient, is illustrated only suggestively, without reference to detail.

The car-body is shown as equipped at each end with a closet, of which 4 indicates one bowl or soil-pipe, and 5 the other. As illustrated, the elements 4 and 5 are properly sections of pipe of suitable diameter to subtend seats, (not illustrated,) and each section is provided with a flanged head 6, which, as by bolts 7, may be secured to the under side of the car-floor. Each section is provided with a transverse slit, within which a pan or gate 8 reciprocates. (See Fig. III.) Said slit may be conveniently formed by the addition of a depending pipe-section 9, secured to the upper pipe-section at a suitably-spaced distance, as by flanges 10 and 11 upon the respective sections and connecting-bolts 12.

The form of bowl illustrated is shown solely by way of example, and the gate 8 represents only a movable member for closing the bowl. It is not our intention to limit ourselves to the employment of any special form of bowl, or to a sliding gate 8; but we have selected the forms illustrated only because they constitute simple devices for performing required functions. For them may be substituted any water-closet mechanism in ordinary use, including, of course, when preferred, the usual flushing apparatus generally comprehended in more elaborate water-closet mechanism. To the gate, or, as it may be more generally denominated, "the movable or dumping member" 8, is secured a rod 13, which is preferably carried by a cross-head 14, working in parallel guides 15, supported, as by brackets 16, underneath the car-floor. Upon its side opposite the rod 13 the cross-head is secured to a piston-rod 17, which, working snugly through cylinder-heads 18 and 19 of a cylinder 20, is provided with a piston 21, working within the cylinder. 22 indicates a coiled spring or buffer to prevent solid impact of the piston against the opposite cylinder-heads. The cylinder 20 is preferably provided upon its upper side with lugs 23, by which it may be bolted to a car-floor, and communicates at one end, as through a pipe 24, with one source of fluid-pressure supply, preferably the air-brake cylinder 2, and at the other, as through a pipe 25, with another source of pressure-supply, preferably the pneumatic signal system above referred to and hereinafter specified. The pipe 24 supplies, through exhaust-air of the brake-system, energy for closing the dumping member 8, and the pipe 25 supplies energy for opening the same.

Preferably within the cylinder-heads are provided exhaust-ports 1, the port 26 being located in the head 18 for exhausting the air supplied from the pipe 25, and the other, the port 27, for exhausting that supplied from the pipe 24. Recesses 28 and 29 in the piston-rod 17 afford, respectively, means of communication between the interior of the cylinder 20 and the respective ports 26 and 27. The recesses are located at such distance apart as to regulate the distance of movements of the piston-rod 17 in opposite directions for opening and closing the gate 8.

The ports 26 and 27 may discharge into the air; but when two closets are carried on one car, as shown in Fig. I, the air from the pipes 24 and 25 may be employed for working the pistons of both closets. For that purpose the ports are illustrated as internally screw-threaded to receive pipes 30 and 31, which operatively connect one of the cylinders 20 upon the car with the other in a manner corresponding to that in which the pipes 24 and 25 are connected with the first cylinder and for a like purpose.

The source of fluid-pressure supply employed in addition to the air-brake cylinder being, preferably, as specified, the pneumatic signal system of the train, we illustrate as a part of such a system a pipe 32, communicating with the usual source of supply (not illustrated) extending by aid of usual appliances from end to end of the train and provided, as usual, with a pressure-indicator 33. Within the pipe 32, at a point preferably located upon the locomotive of the train, is inserted a pressure-reducing plug 34, working snugly within its barrel 35 (see Fig. IV) and provided with a handle 36 for manipulating it. Through the plug 34 runs a diametrical bore 37, and at right angles thereto a vent-recess 38 is located, so that when the bore 37 is in alinement with the pipe 32, as shown in Fig. IV, it constitutes, in effect, a continuation of the bore of the pipe 32; but when the handle 36 is turned a quarter-revolution and the vent-recess is brought opposite the pipe 32 air from the pipe escapes to the outside air. In practice air under pressure is ordinarily confined within the pipe 32, and when the plug 34 is turned to bring the recess 38 into operation it is turned in the direction to shut off the source of air-supply from the pipe 32. Consequently by turning the plug 34 pressure in the pipe 32 behind the plug may be instantly reduced to a degree determinable by the time the plug is allowed to remain in position for relieving the pressure.

In order to utilize the reduction of pressure obtainable in the manner described, we provide a branch pipe 40, leading from the pipe 32 to the interior of the valve-shell 41. (See Fig. V.) The shell 41 is preferably provided with a deep horizontal partition 42 and with an extension 43, preferably threaded to it. A cap 44 closes the upper end of the shell 41, and a diaphragm 45 closes the upper or inner end of the extension-shell 43, whose lower end is closed by a plunger guide-plug 46. The partition 42 and the diaphragm 45 divide the assembled shells 41 and 43 into three distinct chambers 47, 48, and 49. Within the body of the partition 42, which is purposely made heavy enough to accommodate it, is lo-

cated a chamber 50, communicating with the pipe 25 and with the chamber 47 through an opening occupied and controlled by a check-valve 51. Underneath the valve 51 and in vertical axial alinement therewith a piston-rod 52 reciprocates within guideways provided for it in the partition 41, the diaphragm 45, and the stem 53 of the plug 46. The rod 52 carries within the recess 48 a piston 55. The lower end of the rod 52 is preferably reduced to hold a washer 56, against which is seated a cushion-spring 57, coiled around the stem 53 of the plug 46 and supported by said plug. A narrow passage 58 establishes communication between the chambers 47 and 48, and an aperture 59 of similar diameter in like manner unites the chambers 48 and 49, while a recess 60 in the side wall of the chamber 48 extends around the piston 55.

In describing the operation of this apparatus let it be assumed that the air-brake system, including its air-cylinder 2, and the signal system, including the pipe 32, are operative in the usual manner, the pipe 32 being filled with air under pressure and the plug 34 in the position shown in Fig. IV, which is its normal position for maintaining unimpaired pressure within the pipe 32. Under these conditions air-pressure from the pipe 32 will enter the chamber 47 through the pipe 40 and exert itself equally throughout the chambers 48 and 49 above and below the piston 55, which will by force of gravity maintain the position illustrated in Fig. V, its rod 52 being out of contact with the check-valve 51. Air-pressure, however, will not be effectual with the chamber 50, being excluded therefrom, as well as from the pipe 25, by the closure of the valve 51. If now the air-brakes be applied, they will exhaust through the pipe 24 into the cylinder 20, whence the exhaust-air, if it find the piston 21 in the position shown in Fig. III, will issue freely through the port 27. If, on the contrary, the piston 21 should be nearer to the cylinder-head 19 than to the head 18, the air-brake exhaust will first, before finding the port 27, drive the piston to the position shown in Fig. III and in that manner close the gate 8. The positions of the elements shown in Fig. III being therefore those which they occupy except when specially attended to may be called their "normal" positions, the gate 8 of each car being closed to confine within its bowl anything deposited therein. In order to open the bowl and relieve it of its contents, it is only necessary to give the handle 36 a quarter-turn in the direction previously specified. Thereupon the air-pressure in the pipe 32 is instantly reduced. A corresponding reduction is at once effected within the chamber 48 above the piston 55. (See Fig. V.) The excess of pressure of the air confined within the chamber 49 seeking relief finds no other mode than that of egress through the recess 60, and that being small drives the piston 55 upwardly. The piston 55 in its turn forces its rod 52 against the valve 51 and opens the latter. A very slight reduction of the pressure in the pipe 32 suffices to open the valve 51 in the manner described. As soon as the valve 51 opens air from the pipe 32 rushes through the chamber 50 into the pipe 25 and thence into the cylinder 20 in front of the piston 21, driving it back toward the cylinder-head 19 and actuating the dumping member 8. When the piston 21 approaches the head 19, the air in front of it escapes through the recess 28 to the port 26, the handle 36 is turned back to its normal position, and the piston 21 is free to return toward the head 18.

When the member 8 is once actuated, as described, it may remain open till the next operation of the air-brakes, which must occur before approaching a station, or it may automatically close by spring or other power, which would of course be employed if the closet comprehend flushing apparatus as a part of its mechanism.

It may be remarked here, although above stated, that each closet of every car of a perfectly-equipped train is operatively connected with the pipe 32 and that the reduction of air-pressure in that pipe actuates simultaneously each gate 8 by a single manipulation of the handle 36. If, however, any car or cars of the train lack our water-closet equipment, such want of equipment will not interfere with its being coupled into the train.

Although describing in the foregoing specification a preferred form of embodiment of our invention, in which pneumatic energy is generated by air-pressure in excess of atmospheric pressure developed within pipes, yet we contemplate as coming within the scope of our invention the reverse of that method—namely, the development of pneumatic energy through reduction of the pressure below atmospheric pressure or rarefaction of air within the pipes.

What we claim is—

1. The combination with a car of a railway or like train, of a closet-bowl and dumping member thereon, dumping-member-actuating mechanism and means remote from the car for operating said actuating mechanism.

2. The combination with a plurality of cars composing a train, of a closet-bowl and dumping member on each of a plurality of said cars, and means for simultaneously actuating said dumping members.

3. The combination with the car or cars of a train and its locomotive, of a plurality of car-closet bowls, and dumping members, dumping-member-actuating mechanism common to the several members, and means upon the locomotive for operating the dumping-member-actuating mechanism.

4. In a railway-train equipped with a system of air-brakes, the combination therewith of a car provided with a closet, a dumping member, and pneumatically-operative mech-

anism for actuating the dumping member operatively connected with the air-exhaust of the brake system.

5. In a railway-train equipped with a system of air-brakes supplying one source of pneumatic energy, the combination therewith of a car provided with a closet, a dumping member, dumping-member-actuating mechanism operatively connected with said source of energy, and a second source of pneumatic energy also operatively connected with said actuating mechanism, the two energies being adapted to actuate the dumping member alternately in different directions for opening and closing the bowl.

In testimony of all which we have hereunto subscribed our names.

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ALONZO L. VAUGHAN.

Witnesses:
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J. M. BRAUCH.