Sept. 25, 1956 F. B. RUTHERFORD 2,763,871

SANITARY TOILET FOR RAILWAY CARS

Filed May 25, 1953

2 Sheets-Sheet 1

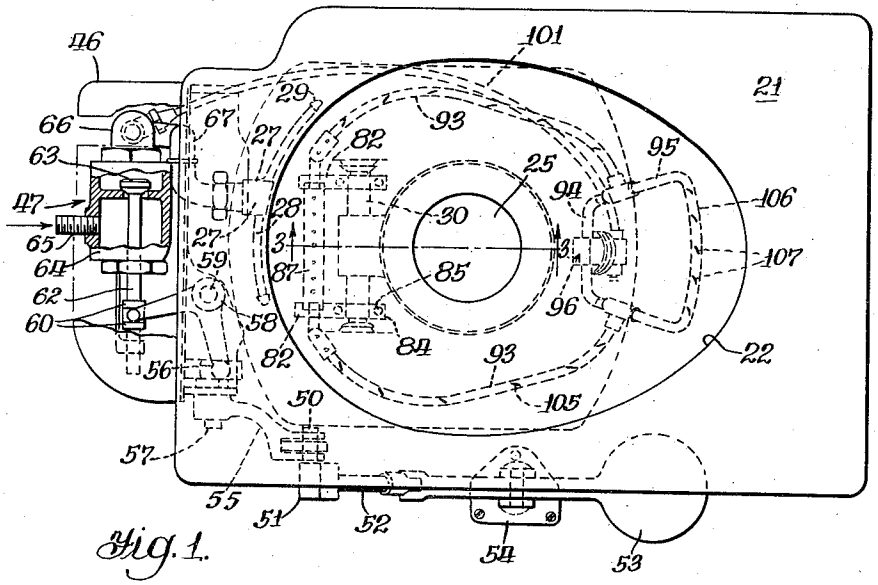


Fig. 1.

Fig. 2.

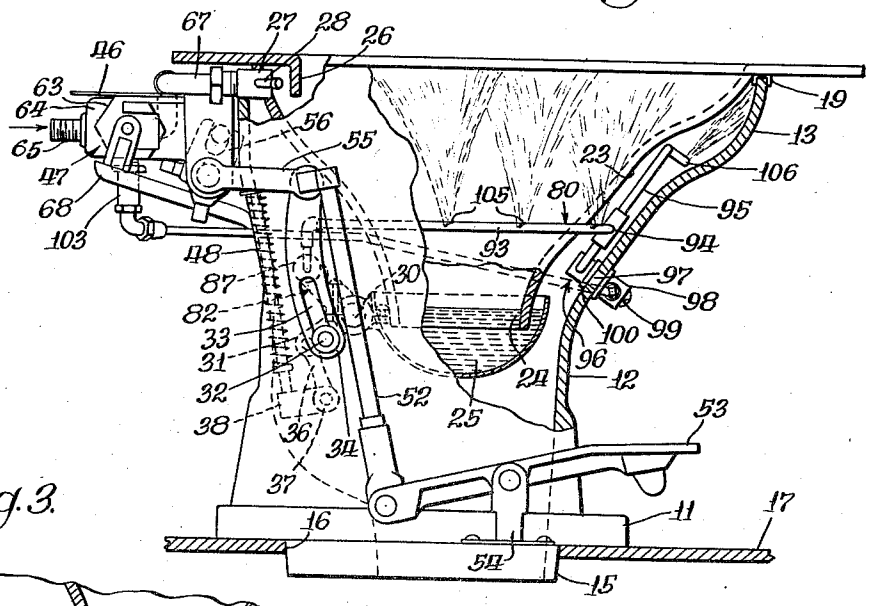
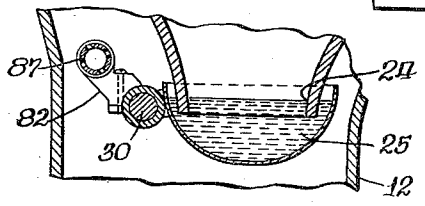


Fig. 3.



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Fig. 4.

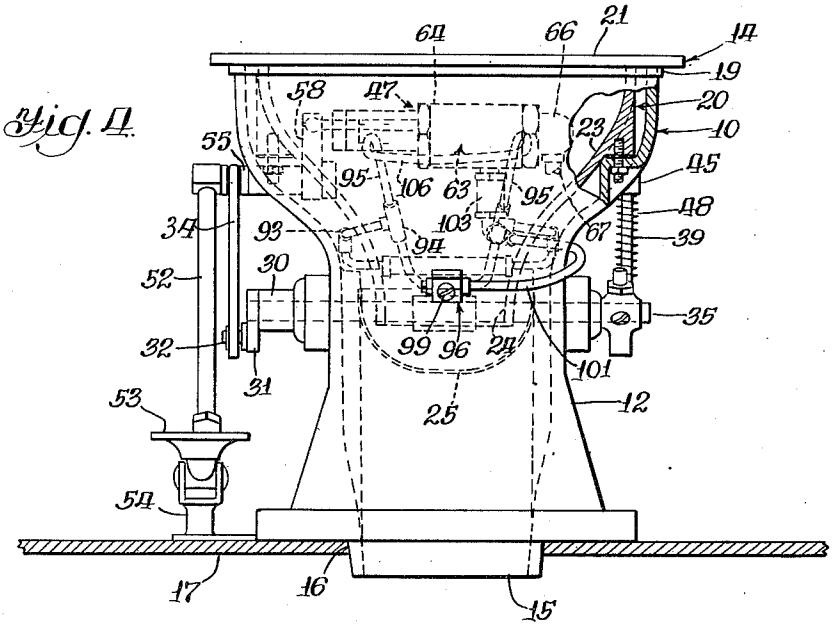


Fig. 5.

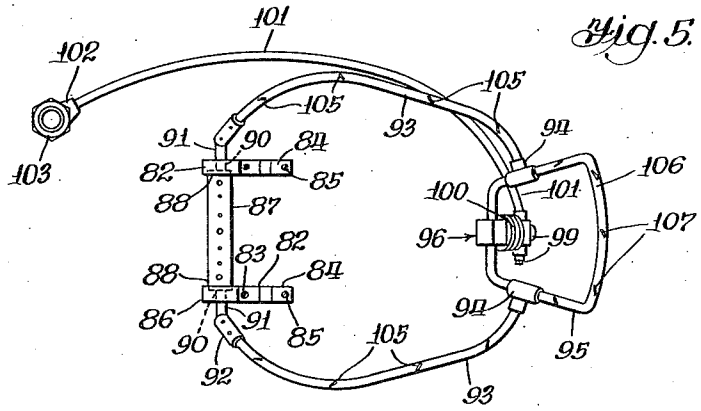
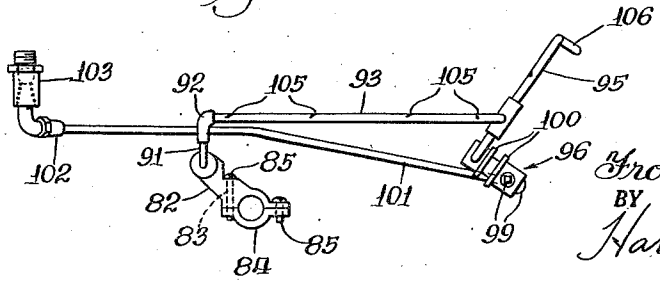


Fig. 6.



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SANITARY TOILET FOR RAILWAY CARS

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Application May 25, 1953, Serial No. 357,291

8 Claims. (Cl. 4—8)

The present invention relates to water closets for railway passenger cars and more particularly to water closets of the type comprising an outer enameled iron bowl and a vitreous china inner bowl or hopper.

Water closets of the above general class are fairly well standardized for railway cars and the various designs vary but slightly from one another. The differences usually encountered reside mainly in the operating mechanism for flushing the closet.

In providing flushing facilities for water closets of the type briefly outlined above, considerable attention has been paid to the efficient flushing of the inner hopper. Usually an arcuate flush pipe is positioned around, or partially around, the upper opening of the hopper just within the rim thereof and is concealed beneath a depending marginal flange which, in addition to concealing the flush pipe, also provides an inverted swirl channel for the water to distribute the same over the upper peripheral regions of the hopper for uniform downward flow over the inner generally conical face thereof toward the discharge opening. The flushing valve is usually disposed at the rear of the outer bowl above the stand portion thereof in a semi-concealed position and is operable under the control of a foot lever pivotally attached to the base of the outer bowl or to the supporting surface on one side of the outer bowl and operatively connected through a linkage mechanism to the valve. Auxiliary linkage mechanism connected to the foot pedal operates a rock shaft which projects into the space existing between the outer bowl and inner hopper and the rock shaft, in turn, operates the internal mechanism which controls the operation of the dump pan.

Inasmuch as, in such dual bowl constructions, the inner hopper is suspended within the outer bowl with the upper rim of the hopper supported from the upper rim of the outer bowl and with the walls of the hopper spaced from the inner walls of the outer bowl, an inverted cone shaped pocket exists between the bowl and hopper which is not serviced by the flushing water and which furthermore is not readily accessible for cleaning purposes. To aggravate the situation, a portion of the operating mechanism for the dump pan or pans is disposed within this space and, as a consequence, this mechanism is subject to fouling by the collection of paper and other objects thrown into the hopper. The sludge and foreign matter, by reason of the drafts and the surging and shaking movements of the car, enter into the space between the inner hopper and outer bowl, thereby creating a foul, unsanitary condition.

In order to alleviate the above noted limitations, it has been necessary to resort to periodic cleaning of the internal space existing between the bowl and hopper by the removal of the inner hopper or by the use of special equipment for directing steam or a detergent into the space with considerable force. Such operations are time-consuming and obnoxious and furhermore, because of the concealed condition of the internal operating mechanism for the dump pan or pans, it is impossible to accurately

direct a steam jet or detergent nozzle toward such areas which may require prolonged treatment to dislodge collected refuse.

The present invention is directed toward an auxiliary flushing mechanism, operable under the control of the same flushing valve and operating instrumentalities therefor which control the flow of flushing water to the inner hopper, such mechanism serving to effectively flush the internal space existing between the outer bowl and inner hopper as well as to flush such portion of the dump pan linkage mechanism as may be disposed within this space or immediately below the space.

Accordingly, it is among the principal objects of the invention to provide such an auxiliary flushing mechanism in which the flush pipe fittings therefore are so constructed that a series of jets of flushing water will be directed in an efficient manner against the outer surface of the inner hopper and against the inner surface of the outer bowl so as to effectively loosen and flush away any deposits of sludge, scum or other refuse that may have lodged on these surfaces.

A further object is to provide an auxiliary flushing mechanism of this character wherein certain of the jets of water employed for flushing purposes are in the form of continuously flowing flat ribbon jets of the liquid, the direction and extent of which is such that the jets will strike both the inner and the outer bowls at angles which are considered to be most effective for removal of deposited sludge. By such an arrangement a single jet is caused to perform services that ordinarlily would require two separate jets and thus not only may greater flushing force be attained in the individual jets, but conservation of water is effected at each individual flushing operation.

It is a further object of the invention to provide a flush pipe system for dual bowl closets which incorporates special jets for reaching the more remote and inaccessible recesses within the space existing between the two bowls.

Yet another object, in a flushing system of this type, is to provide a means for directing flushing water against and over the internal linkage mechanism and hinges associated with the dump pan during the time that the linkage mechanism is in actual operation so that this mechanism is exposed to the flushing action of the jets while the ravious parts thereof are in motion to thus expose large areas thereof to the direct forces of the jets.

A still further object is to provide an auxiliary flushing system for the internal space existing between the two bowls of a dual bowl closet which is operable simultaneously with the conventional flushing system for the inner hopper and which has facilities for connecting the same to a steam line or a source of detergent or other external source of flushing liquid under pressure, for extraordinary flushing operations when desired and which, during such special flushing operations, will automatically become disconnected from the regular flushing source, i. e. the flushing valve and upper hopper flush pipe so that there will be no egress of the fluid from the latter.

The provision of an auxiliary flushing system including a flush pipe arrangement which may, without structural alterations, be adapted for use with closet bowls and hoppers of varying size and shape, one which is possessed of a minimum number of moving parts and which consequently is unlikely to get out of order; one which is rugged and durable; one which may be designed as a component part of new installations or which may be easily applied to existing closet installations; and one which otherwise is well adapted to perform the services required of it, are further desirable features that have been borne in mind in the production and development of the present invention.

The invention is illustrated in one preferred embodiment in the accompanying drawings, wherein:

Fig. 1 is a top plan view of a dual bowl, single pan water closet installation constructed in accordance with the principles of the present invention;

Fig. 2 is a side elevational view of the installation shown in Fig. 1. In this view a portion of the outer bowl and of the inner hopper have been broken away to more clearly reveal the nature of the invention;

Fig. 3 is a fragmentary section taken on line 3—3 of Fig. 1;

Fig. 4 is a front elevational view of the installation of Fig. 1;

Fig. 5 is a top plan view of a flushing pipe assembly employed in connection with the present invention; and

Fig. 6 is a side elevational view of the assembly shown in Fig. 5.

Referring now to the drawings in detail and in particular to Figs. 1 to 3 inclusive, a railway car closet of the dual bowl, single pan type has been illustrated and involves in its general organization an outer bowl **10** having a base portion **11**, a relatively narrow stand portion **12** and an upper outwardly flared bowl portion **13** provided with a rim **14**. The usual outlet flange **15** depends from the base **11** and is adapted to extend through an opening **16** provided in the car floor **17**.

Suspended from the rim **14** and generally centered within the tubular configuration of the outer bowl **10** is an inner hopper **20** having a flat extended rim portion **21** adapted to rest upon the rim **14** of the outer bowl **10** and providing a central opening **22** from which there depends the inwardly sloping hopper wall **23** which terminates at its lower end in a discharge opening or outlet **24**. A gasket **19** effects a seal between the outer bowl **10** and hopper **20**. A dump pan **25** normally closes the lower end of the hopper **23** and its movements are controlled in a manner and by mechanism that will subsequently be described.

The rim portion **21** of the hopper **20** is formed with an overhanging flange or apron **26** (Fig. 2) beneath which there is concealed the usual spray head or flush pipe assembly **27** shown in dotted lines in Fig. 1 and in section in Fig. 2. The flush pipe assembly is of conventional construction and includes the usual perforated curved flush pipe proper **28** and tangentially directed nozzle **29**.

The dump pan **25** is fixedly mounted on a transverse shaft **30** extending through and suitably journalled in the side walls of the stand portion **12**. An arm **31** is secured to the shaft **30** at the left side of the stand portion as seen in Fig. 4 and is provided with a pin **32** extending into a slot **33** provided in the lower part of a link **34**. The opposite end of the shaft is squared as at **35** and has mounted thereon an arm **36**, the free end of which is pivotally secured to one end of a link **37**. The other end of the link **37** has secured thereto a block **38** to which is fixed the lower end of a rod **39**. The upper end of the rod **39** is slidable in a bracket **45** suitably secured to a stationary part of the closet, preferably the supporting bracket **46** of a flushing valve mechanism designated in its entirety at **47**. A spring **48** surrounds the rod **39** and bears at its lower end against the block **38** and at its upper end against the bracket **45** and serves to normally urge the dump pan **25** to its closed position.

The upper end of the link **34** is pivotally connected to a stud **50** carried in a block **51** mounted on the upper end of a link **52** the lower end of which is pivoted to the rear end of a foot lever **53** which in turn is pivoted to a bracket **54** suitably anchored to the car floor **17**. The upper end of the link **52** is also pivotally connected through the stud **50** to one end of a short link **55** and the other end of the link **55** is connected to a rocker cam **56** mounted on a horizontal shaft **57**. The free end of the rocker cam **56** engages one end of a bell crank lever **58** pivoted on a vertical shaft **59** and the other end of the bell crank lever is confined between a pair of spaced

collars **60** formed on the operating plunger **62** of the flushing valve proper **63**, the flushing valve assembly **47** being suitably mounted on the bracket **46**.

The flushing valve **63** is purely conventional in its design and construction and no claim is made herein to any novelty associated with the same. The valve includes the usual outer casing or body **64** having an inlet **65** for water and a bell housing portion **66** providing a valve outlet chamber having an outlet connection **67** communicating with the flush pipe **27**. The usual drip pan **68** underlies the valve body **64** and communicates with the interior of the stand portion **12**.

From the above description it will be seen that upon depression of the foot lever **53**, the link **52** will be moved upwardly as viewed in Fig. 4 and motion will be transmitted from the link **52**, through the short link **55** and rocker cam **56** to the bell crank lever **58** which will be moved in a clockwise direction as viewed in Fig. 1. Such movement of the lever **58** will cause the operating plunger **62** of the flushing valve **63** to be moved to the right as seen in Fig. 4, thus opening the valve and supplying water to the outlet chamber and outlet connection **67** from whence it is conducted to the spray head or flush pipe assembly **27**. Upward movement of the link **52** also causes the slotted link **34** to be moved upwardly and, when the lower end of the slot **33** provided in the link **34** engages the pin **32**, the arm **36** is lifted upwardly to cause turning movement of the shaft **30** in a clockwise direction as seen in Fig. 2, thus swinging the dump pan **25** downwardly to spill the contents thereof.

During such movements of the linkage system as have just been described, the spring **48** is placed under compression and, thereafter, upon release of the foot pedal **53**, the spring will restore the parts to their initial or normal positions to close the flushing valve and restore the dump pan to its closed position over the discharge opening **24**. It is to be noted that the pin **32** will restore the dump pan **25** to closed position a short time before the valve **46** becomes fully closed. This allows sufficient water to issue from the flush pipe **28** to collect in the pan **25** to assure a good liquid seal.

The flushing mechanism of the present invention appears in Figs. 1 to 4 inclusive and is illustrated in detail in Figs. 5 and 6. This mechanism includes an auxiliary flush pipe assembly designated in its entirety at **80** which has been constructed so as to efficiently service the interior space existing between the outer bowl **10** and the inner hopper **20**. The rear portion of the assembly is supported by a pair of spaced brackets **82**, each of which is in the form of a clamping device including an arm **83** having a detachable connecting rod type of block and cap assembly **84** at one end thereof adapted to movably enclose the dump pan shaft **30** adjacent an end thereof and held in its assembled relation by means of screw **85** (Fig. 6). The other end of each bracket **82** is formed with a socket **86** therein which receives an end of a perforated spray tube **87** and the tube may be permanently sealed in the socket by the application of solder as indicated at **88**.

Each socket **87** communicates through a small bore **90** with a male elbow **91** which is coupled to a second elbow **92** which in turn is coupled to one end of a curved spray pipe or tube section **93** which extends forwardly within the space existing between the lower bowl **10** and the hopper **20**. The two tubes **93** are bowed outwardly as shown in Figs. 1 and 5 partially encompass the medial region of the hopper walls **23**. At their forward ends, the tubes **93** communicate with the medial leg of a pair T-fittings **94** which are connected by an upwardly projecting generally U-shaped spray pipe or tube **95** located at the forward region of the hopper **10** slightly above the upper end of the stand portion **12**. The T-fittings **94** are also connected to a plug connection designated in its entirety at **96** which extends through an opening **97** in the front of the lower bowl wall and having an external

portion 98 provided with a removable threaded plug 99 enabling the connection 96 to be attached to the end of a steam or detergent supply line for flushing purposes when desired. The plug connection is sealed in the opening 97 by means of suitable rubber or other resilient sealing washers 100. A curved lead-in pipe 101 extends into the space between the bowl 10 and hopper 20 and is connected at its rear end through an elow fitting 102 to a check valve 103 which in turn is connected to the outlet side of the flush valve 63. The other end of the lead-in pipe 101 is connected to the plug connection 96. The various elements of the flush pipe assembly 80 thus far described may be suitably joined together and sealed by the application of solder to the joints for a more permanent installation.

From the above description it will be seen that the flush pipe assembly 80 is anchored in position within the lower bowl 10 by means of the plug connection 96 just described at its forward region and by the brackets 82 at its rear region. Furthermore, because of the fact that the various parts of the assembly are interconnected by threaded unions and also are capable of bending under the application of stress, the assembly may be adjusted to accommodate water closet installations having bowl or hopper shapes which vary somewhat in their design or shape.

The tube sections 93 are provided with a series of spray or jet openings 105 in the upper sides thereof and these openings are preferably in the form of narrow slots which extend at different angles to the curvilinear axes of the tube sections. The slots 105 are designed to establish a fan-shaped spray or jet of water when the flushing valve 63 is opened for flushing purposes. The disposition of the slots 105 is such that each slot creates an extremely forceful fan-shaped jet of water which is sufficiently wide and diverging as to service both the adjacent outer surface of the hopper 20 and the adjacent inner surface of the bowl 10. The fan-shaped jets are directed toward the adjacent surfaces of the bowl and hopper at acute angles with respect thereto with the jets approaching these surfaces almost tangentially. It has been found that by the use of jets of this character and so directed, an extremely effective sludge or scum removing action is attained wherein any substantial deposits of the material may be said to be pried from the surface of the bowls and thus loosened for flushing purposes.

The upwardly extending U-shaped flush pipe section 95 is provided with a forwardly extending bight portion 106 (Fig. 2) and the upper side of the bight portion is likewise formed with a series of spaced inclined slots 107 similar to the slots 105 and capable of producing similar fan-shaped jets which strike the adjacent walls of the bowl 10 and hopper 20 almost tangentially as previously described. These latter jets reach the less accessible region or pocket provided in the upper reaches of the chamber existing between the bowl and hopper.

It will be understood that because the flush pipe assembly 27 for the inner hopper 20 and the flush pipe assembly 80 for the space existing between the bowl 10 and hopper 20 are both connected to the outlet side of the flushing valve 63, depression of the foot lever 53 will effect simultaneous flushing operations by both of these assemblies. At periodic intervals, say at the end of each run, or at selected time intervals which may be considered appropriate, a steam line or detergent supply line may be connected to the connection 96 after the plug 99 has been removed. During such flushing operations, the check valve 103 will prevent the steam or detergent from entering the bell housing portion 66 or outlet side of the flushing valve 63 and in this manner it is prevented from escaping through the flush pipe assembly 27 of the inner hopper 20 so that the force of the flushing fluid is confined to the jets 105 and 106 for more efficient flushing operations.

I claim:

1. In combination with an outer bowl and inner hopper of a railway car water closet constructed and assembled to provide an internal annular space between them, manually operable flushing valve mechanism for directing flushing water into said inner hopper to cleanse the same, and means for cleansing the space between the said hopper and the outer bowl comprising a flush pipe disposed in said annular space and at least in part encircling said hopper between the wall thereof and the wall of said outer bowl and provided with a series of discharge ports positioned to direct jets of flushing liquid at acute angles against both walls of said annular space, and a conduit connecting said flush pipe with said flush valve, whereby flushing water is directed to said internal annular space simultaneously with the flushing of the inner hopper.

2. In a railway car water closet, the combination with an outer bowl, an inner hopper having a wall spaced from the wall of said bowl and a flush valve for directing water into the said hopper to cleanse the same, of a flush pipe disposed between said bowl and hopper and encircling the latter in a generally horizontal direction and spaced from both the hopper and the bowl, there being a series of spaced slots formed at various angles with respect to each other in the upper surface of said flush pipe, each of said slots intersecting the bore of said pipe and being of a depth sufficient to produce a fan-like jet of flushing water of a width sufficient to impinge against the adjacent surfaces of the bowl and hopper, and a conduit connecting said flush pipe to the flush valve, whereby flushing water is delivered to said flush pipe simultaneously with the delivery of flushing water into said hopper.

3. A railway car water closet comprising, in combination, an outer bowl, an inner hopper extending downwardly into the outer bowl with its wall spaced from the outer bowl, a flushing mechanism including a valve for directing flushing water into said hopper to cleanse the same, the said hopper being provided with a bottom discharge opening, a rock shaft extending across said space between said outer bowl and the inner hopper at substantially the level of and at one side of said discharge opening, a dump pan carried by said shaft and movable upon turning of the latter to open and close the discharge opening of said hopper, operating instrumentalities for the shaft, a pair of vertically extending brackets having their lower ends loosely encircling said shaft, a perforated spray tube arranged between and secured to the upper ends of said brackets, there being a series of spray openings in said spray tube for directing jets of water against the walls of said bowl and hopper and against said shaft, a flush pipe partially encircling said hopper above the level of the discharge opening thereof and having connections with the opposite ends of said spray tube, there being a series of jet-producing openings in said flush pipe at spaced points therealong, each capable of producing a jet of flushing water directed against both the bowl and the hopper walls, and a conduit connecting said flush pipe with said flush valve, whereby flushing water is directed to the said flush pipe simultaneously with the flushing of the inner hopper.

4. A railway car water closet as set forth in claim 3 characterized in that the jet producing openings are formed in the upper surfaces of said flush pipe so as to direct the jets of water upwardly into engagement with said walls.

5. A railway car water closet as defined in claim 3 characterized in that the flush pipe includes an upwardly projecting extension at its forward end for directing flushing water against the walls of said bowl and hopper in the vicinity of upwardly and forwardly extending portions of said bowl and hopper.

6. In combination with an outer bowl and inner hopper of a railway car water closet constructed and assembled to provide an internal annular space between them, manu-

ally operable flush valve mechanism for directing flushing water into said inner hopper to cleanse the same, and means for cleansing the space between said hopper and the outer bowl comprising a flush pipe disposed in said annular space and at least in part encircling said hopper between the wall thereof and the wall of said outer bowl and provided with a series of discharge ports positioned to direct jets of flushing liquid at acute angles against both walls of said annular space, a hollow plug connection provided with two ports and extending through the wall of said outer bowl and communicating with said flush pipe, a conduit leading from one port of said plug to said flush valve, whereby flushing water is delivered to the flush pipe simultaneously with the flushing of the inner hopper, a closure for the other port of said plug adapted on removal to permit the delivery of cleansing fluid to the flush pipe independently of said flush valve.

7. A combination structure as defined in claim 6 characterized in that a check valve is disposed between the said plug connection and said flush valve for preventing fluid introduced under pressure through said plug from entering the flush valve.

8. A railway car water closet comprising, in combination, an outer bowl, an inner hopper extending downwardly into the outer bowl with its wall spaced from the outer bowl, a flushing mechanism including a valve for directing flushing water into said hopper to cleanse the same, the said hopper being provided with a bottom discharge opening, a rock shaft extending across said space between said outer bowl and the inner hopper at substantially the level of and at one side of said discharge opening, a dump pan carried by said shaft and movable upon turning of the latter to open and close the discharge opening of said hopper, operating instrumentalities for the shaft, a pair of vertically extending brackets having their lower ends loosely encircling said shaft, a perforated spray tube arranged between and secured to the upper ends of

said brackets, there being a series of spray openings in said spray tube for directing jets of water against the walls of said bowl and hopper and against said shaft, a flush pipe partially encircling said hopper above the level of the discharge opening thereof, and having opposed ends fixed in said brackets and communicating with said spray tube, there being a series of jet-producing openings in the flush pipe at spaced points therealong, each capable of producing a jet of flushing water directed against opposed walls of the bowl and said hopper, a hollow plug connection provided with two ports and extending through the wall of said bowl and communicating with said flush pipe, whereby the said plug and said brackets serve to support the flush pipe and spray tube as a unit in spaced relation to the outer bowl and inner hopper, a conduit leading from one port of said plug to said flush valve, whereby flushing water is delivered to the flush pipe simultaneously with the flushing of the inner hopper, a closure for the other port of said plug adapted on removal to permit the delivery of cleansing fluid to the flush pipe independently of said flush valve, and a check valve interposed in said connector between said plug and said flush valve to prevent cleansing fluid introduced through said plug from entering the flush valve.

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