July 8, 1952 S. DUNER 2,602,165

WATER CLOSET

Filed Aug. 8, 1946 3 Sheets-Sheet 1

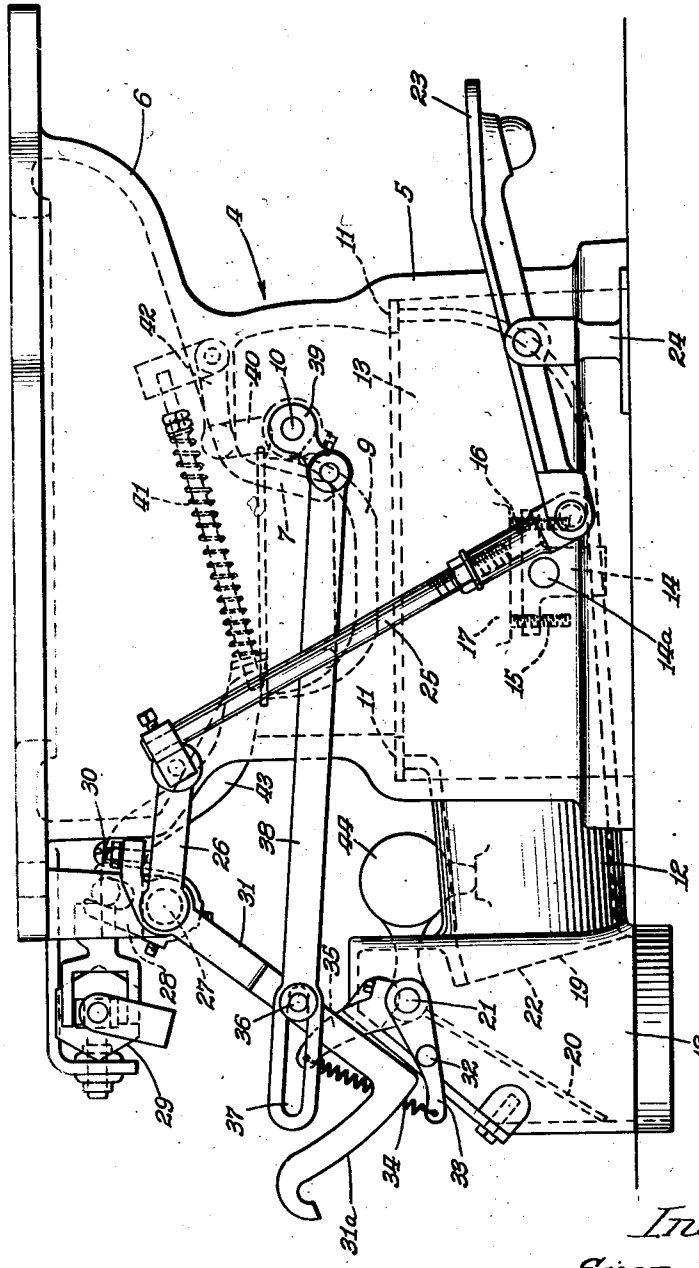


Fig. 1.

Inventor:
Sven Duner
By
Albert I. Kegan Attty

July 8, 1952 S. DUNER 2,602,165

WATER CLOSET

Filed Aug. 8, 1946 3 Sheets-Sheet 2

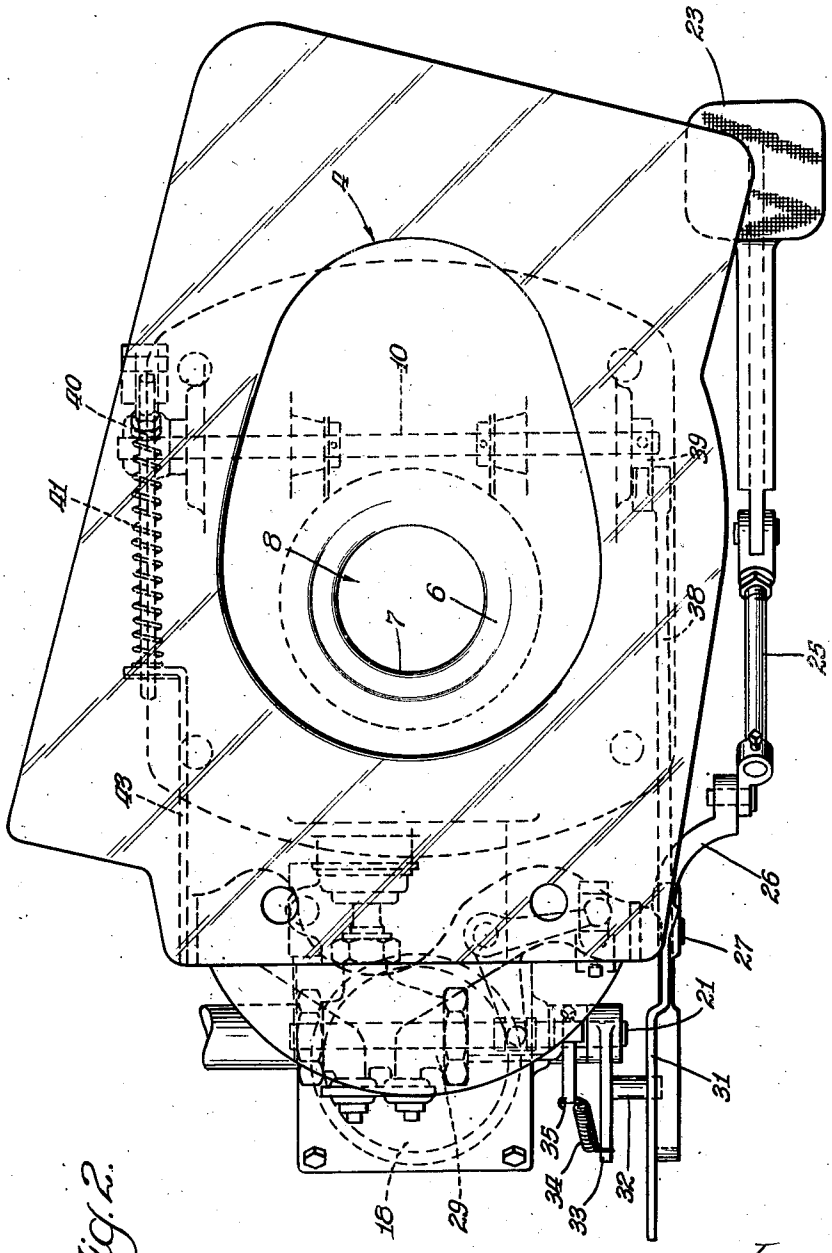


Fig. 2.

Inventor
Sven Duner
By
Albert I. Regan
Atty.

July 8, 1952 S. DUNER 2,602,165

WATER CLOSET

Filed Aug. 8, 1946 3 Sheets-Sheet 3

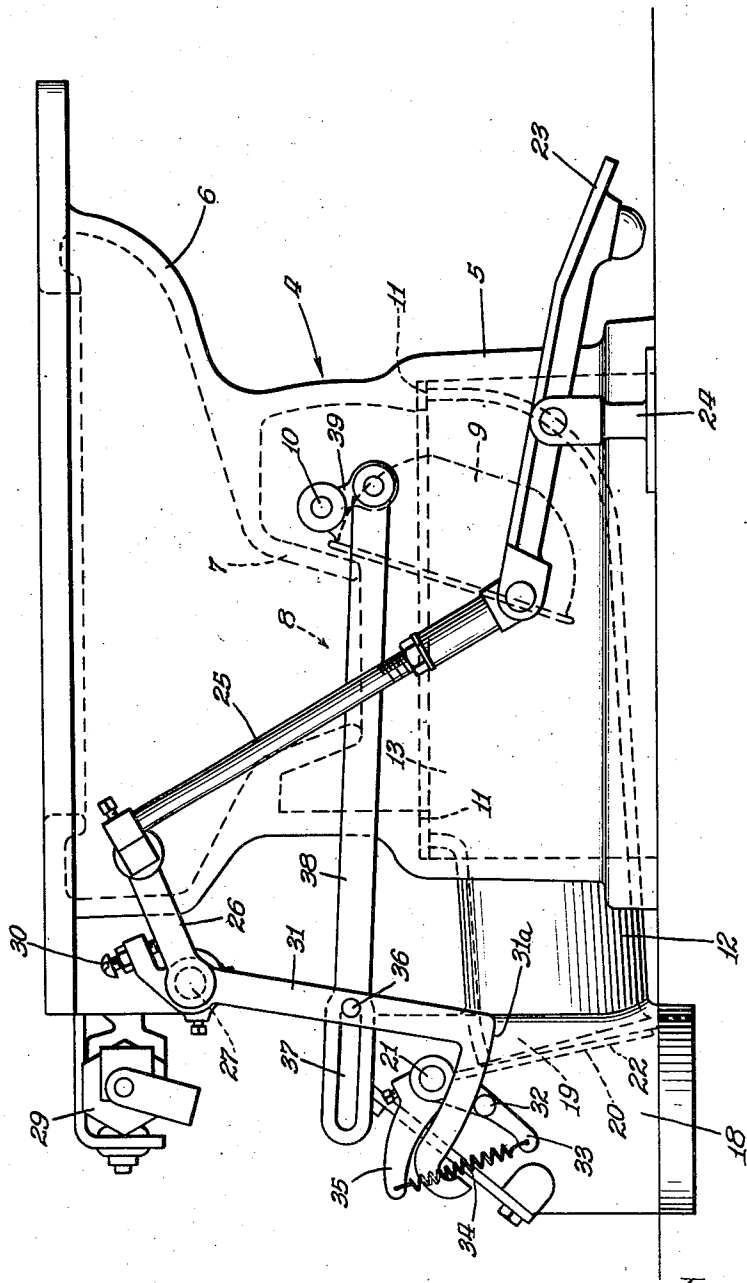


Fig. 3.

Inventor
Sven Duner,
By
Albert I. Regan
Atty.

Patented July 8, 1952

2,602,165

UNITED STATES PATENT OFFICE

2,602,165

WATER CLOSET

Sven Duner, Chicago, Ill., assignor to Duner Company, Chicago, Ill., a corporation of Illinois

Application August 8, 1946, Serial No. 689,245

2 Claims. (Cl. 4—8)

1

This invention relates generally to water closets, and more particularly to an improved type of water closet for use in railway cars and the like.

Hoppers for railway car water closets customarily are designed with two outlets, the first being the outlet from the bowl where the water seal is formed and the second being the floor or draft outlet through which the waste passes from the car. In order to prevent up-drafts of air through the hopper which could splash the contents of the bowl over the floor, the two outlets are never completely open at the same time, thus functioning like locks in the waste passage.

Previous water closets of this type have been constructed with the bowl outlet and the draft outlet in vertical alignment. My invention differs in one important respect from these prior art constructions in that the draft outlet is horizontally spaced from the bowl outlet. This horizontal spacing results in a number of advantages. First, the draft chute need not pass through the floor a foot or more away from the car wall as must be the case with the prior art hoppers. My invention accordingly permits the positioning of the draft chute immediately adjacent the car wall. In some installations, as for example, in the upper roomettes of two-deck Pullman cars this positioning of the draft chute next to the car wall is a very important advantage as the drain pipe from the upper roomette hopper may then be carried through the lower roomette inconspicuously and with greater economy of space. Further, my invention for the first time provides a water closet characterized by a vertical closure for the draft outlet, instead of the horizontal closures previously employed. This vertical closure requires less angular displacement to obstruct the draft opening and thus is speedier and more positive in action. Still further, my vertical closure construction allows the use of smaller and cheaper draft chutes; for example, I can employ a chute 4½ inches in diameter with my invention in comparison to the 7 inch chute required with the conventional hopper.

It is the principal object of this invention, therefore, to provide for railway cars and the like a water closet wherein the draft outlet is horizontally spaced from the bowl outlet, thus adapting said water closets to meet changing conditions of design in said railway cars and the like.

The foregoing and such other advantages, objects, and capabilities as may appear herein or be pointed out as this description proceeds, or as are inherent in the present invention, are illustrated in the accompanying drawings, in which:

2

Figure 1 is a side elevation of a water closet embodying my invention, showing the foot pedal in its normal raised position;

Figure 2 is a plan view of the water closet shown in Figure 1; and

Figure 3 is a side elevation similar to Figure 1 but showing the foot pedal in depressed position as when the flushing operation is half-way completed, and omitting a number of lesser interior parts in order to expose more clearly the working of other more important parts.

Like reference characters indicate similar parts in the drawings and in the description of invention which follows:

Referring now more particularly to the drawings the numeral 4 indicates generally a water closet hopper preferably made of vitreous china; but which, of course, may be constructed of metal or any other suitable material. The hopper 4 comprises a hollow stand portion 5 and a bowl 6 integral therewith and supported thereby. As best shown in Figure 3, the bowl 6 is constructed with a depending portion 7 open at the lower end thereof to form the bowl outlet 8. This bowl outlet 8 is normally closed by a dump pan 9 which is rigidly secured to a rotatable shaft 10 extending transversely through the hopper 4 in front of the depending portion 7.

In the mid-portion of the hollow stand 5 is formed an interior, annular flange 11. A pipe 12 extends into the stand 5 through an opening in a rear wall thereof below the flange 11, and said pipe terminates in an upwardly projecting portion 13. The pipe 12 is supported by a bracket 14 (Figure 1) fixed to the stand 5 by a bolt 14a and engaged by a pair of screws 15 and 16 depending from a boss 17 formed in said pipe. Rotation of the screws 15 and 16 in the proper direction will raise the boss 17 and the pipe 12 until the upwardly projecting portion 13 is firmly seated against the flange 11 as shown in the drawings.

The pipe 12 communicates from the interior of the stand 5 to the vertical draft chute 18 rearwardly positioned from said stand. The end 19 of the pipe 12 projects into the chute. A draft plate 20 is rigidly secured to the shaft 21 extending transversely through the chute 18. Normally, the plate 20 is in open position with respect to the pipe end 20 as shown in Figure 1, but upon rotation of the shaft 21 in the sequence of the flushing operations hereinafter described, the plate 20 is brought against the pipe end 19 to close the draft outlet 22.

From a starting position of parts as shown in

Figure 1, means are provided for successively opening a flushing valve 29 to supply water to the bowl 6, closing the draft outlet 22, opening the bowl outlet 8, shutting off said flushing valve 29, closing said bowl outlet 8, and opening said draft outlet 22. The flushing operation is commenced by depressing the foot pedal 23 pivoted upon the floor bracket 24. Depression of the foot pedal 23 translates upwardly the adjustable link 25. The link 25 and its functioning are fully described in Patent No. 2,278,887, issued April 7, 1942, to the Duner Co. of Chicago, Illinois, as assignee of Nels Larson. The upward translation of the link 25 rotates counterclockwise the crank arm 26 and the shaft 27 to which said crank arm is fixed. Also fixed to the shaft 27 is a U-shaped arm 28, the rotation of which with the shaft 27, operates a flushing valve 29, exemplified herein as similar to the valve described in Patent No. 1,711,635, issued May 7, 1929, to John C. Duner.

At this phase of the flushing operation the valve 29 is supplying water to the bowl 6. Further rotation of the crank arm 26 picks up the set screw 30 which is positioned at the end of a cam arm 31 which cam arm is pivoted freely on the shaft 27. The resulting counterclockwise rotation of the cam arm 31 causes the end thereof remote from the set screw 30 to pick up the pin 32, which slides over and is carried in a counterclockwise downward arc by the cam surface 31*a*. The pin 32 projects from an arm 33 which is pivoted freely at one end upon the shaft 21. The other end of the arm 33 is yieldably interconnected by a spring 34 with an end of a similar arm 35. Consequently, the arm 35 follows the counterclockwise rotation of the arm 33 caused by the downward arcuate travel of the pin 32. The arm 35 however is fixed at its other end to the shaft 21, and counterclockwise rotation of said shaft brings the draft plate 20 against the pipe end 19 to close the draft outlet 22. Should anything clog the draft outlet 22 so that the draft plate 20 cannot completely close against the pipe end 19, the spring 34 will merely undergo greater tension in permitting the pin 32 its full travel, thereby preventing damage to any of the parts.

My invention also contemplates novel mechanism especially adapted for proper sequential operation of the draft and bowl outlets in my novel hoppers wherein said outlets are horizontally spaced. As best shown in Figure 3, there extends outwardly from the mid-portion of the cam arm 31 a pin 36 engaged in a slot 37 formed in the end of a strap 38. The length of the slot 37 is such that the pin 36 does not engage the end thereof until the cam arm 31 has rotated sufficiently to close the draft opening 22. At such time the pin 36 contacts the end of the slot 37 and further rotation of the cam arm 31 translate the strap 38 forward. This translation rotates the crank 39 pivoted upon the end of the strap 38 remote from the slot 37, and rotates the shaft 10 to which the crank 39 is fixed. Rotation of the shaft 10 swings the dump pan 9 downwardly and forwardly to open the bowl outlet 8. Figure 3 depicts the positions of parts at this phase of the flushing operation.

The pivoting of the dump pan 9 in the front of the stand 5 leaves the entire cross-sectional area of the pipe 12 unblocked for the passage of waste, and said dump pan is thus not put in position to pick up any of the passed material. Were the pan 9 pivoted to swing rearwardly as is the case with conventional hoppers, the pipe 12 would

be almost completely blocked and the pan 9 would trap almost all the waste passing from the bowl 6. In the construction of my novel water closet, however, both the dump pan 9 and the draft plate 20 in their movement offer as little interference as possible to the passage of water and waste from the bowl 6 through the pipe 12 and out the chute 18.

Rotation of the shaft 10 to drop the dump pan 9 results in the rotation of another crank 40 fixed to said shaft and the compression of a spring 41 between still another crank 42 and a fixed bracket 43. The compression of the spring 41 builds up a force to return the dump pan 9 to its original closed position in the reverse half of the flushing operation. This reverse half of the flushing operation is initiated by releasing pressure upon the foot pedal. The weight of the adjustable link 25 causes it to drop and to rotate the crank arm 26 clockwise, in turn rotating the U-shaped arm 28 and closing the valve 29. The compressed spring 41 rotates the dump pan shaft 10 clockwise, swings the dump pan 9 upward and translates the strap 38 rearward. The end of the slot 37 carries the pin 36 in a rearward arc rotating the cam arm 31 clockwise and releasing the pin 32. The dropping of a counterweight 44 fixed to the draft plate shaft 21 swings the draft plate 20 to its original open position. The operating mechanism is thus fully returned to its starting position.

From the foregoing it is apparent that I have invented a novel water closet particularly advantageous to use in railway cars and other moving vehicles. Economy of space is the principal consideration involved in the design of such cars and vehicles, and my novel water closets incorporating horizontally spaced bowl and draft outlets permit the most efficient allocation of space in said cars and vehicles. My invention having been thus described and its utility indicated, the scope of said invention is defined in the appended claims. But in connection therewith, it is to be understood that the foregoing description has been specific for the purposes of illustration only and that I intend to embrace as my invention all the modifications thereof within the scope of said appended claims.

I claim:

1. A water closet for vehicles consisting of a hollow stand having an interior, annular flange in the mid-portion thereof and an opening in a rear wall thereof below said flange; a bowl integral with said stand and supported thereby, said bowl having an open lower end depending into said stand; a vertical draft chute rearwardly positioned from said stand; a substantially horizontal pipe projecting at one end into said chute and communicating therefrom into said stand through said opening therein, the other end of said pipe being formed with an upwardly projecting portion which is seated against said flange; a dump pan normally fitting over said open lower end of said bowl; means for swinging said dump pan downwardly from said bowl and forwardly thereto; a draft plate positioned in said chute adjacent said pipe end projecting thereinto, pivot means for said draft plate positioned above said pipe end in said chute; means normally holding said draft plate away from said pipe end and to one side of said draft chute, means for turning said draft plate on said pivot means to close said pipe end; and foot-pedal operated mechanism for effecting the sequence of opening a flushing valve, closing said draft plate, drop-

ping said dump pan, shutting off said flushing valve, closing said dump pan and opening said draft plate.

2. A water closet for vehicles comprising: a unitary bowl and hollow stand therefor, said bowl being formed with an opening into said stand; a pivoted dump pan normally closing said opening; means for swinging said dump pan downwardly from said opening and forwardly thereto; a draft chute rearwardly positioned from said stand; a substantially horizontal pipe communicating from said chute into said stand, one end of said pipe projecting into said chute; a draft plate for closing said pipe end; pivot means for said draft plate positioned above said pipe end; means normally holding said draft plate away from said pipe end and to one side of said draft chute; means for rotating said draft plate to close said pipe; mechanism for actuating said dump pan and said draft plate; and a transverse link, with a cam slot formed therein,

transmitting motion from said actuating mechanism to said dump pan to effect a predetermined time lag between the actuation of said dump pan and said draft plate.

SVEN DUNER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
251,767	Daniell	Jan. 3, 1882
360,337	Bunting	Mar. 29, 1887
2,258,453	Johnson	Oct. 7, 1941

FOREIGN PATENTS

Number	Country	Date
4,557	Great Britain	Oct. 19, 1881
359,559	France	Mar. 30, 1906