March 23, 1948. J. H. DERBY 2,438,207

MEANS FOR CONTROLLING THE FLUSHING OF URINALS

Filed March 16, 1944 2 Sheets-Sheet 1

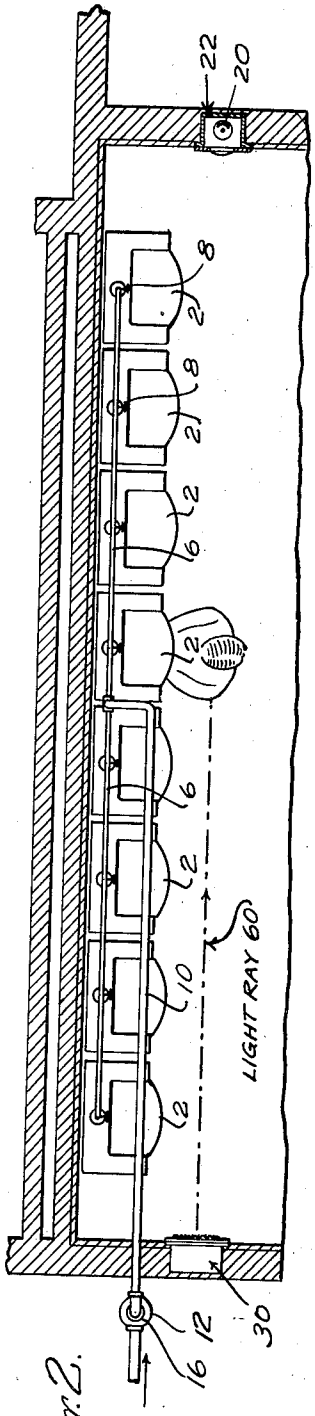


Fig. 2.

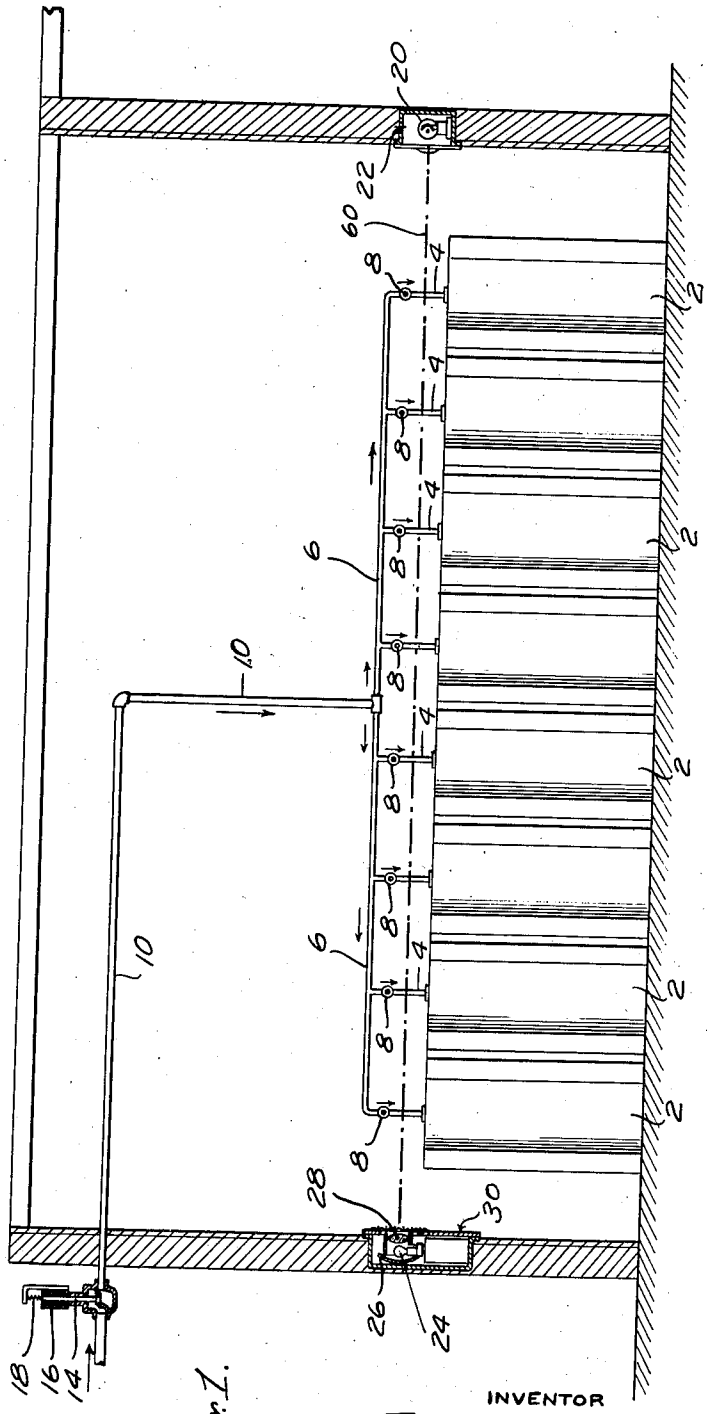


Fig. 1.

INVENTOR
JOHN H. DERBY.
BY H. Dorsey Spencer
ATTORNEY

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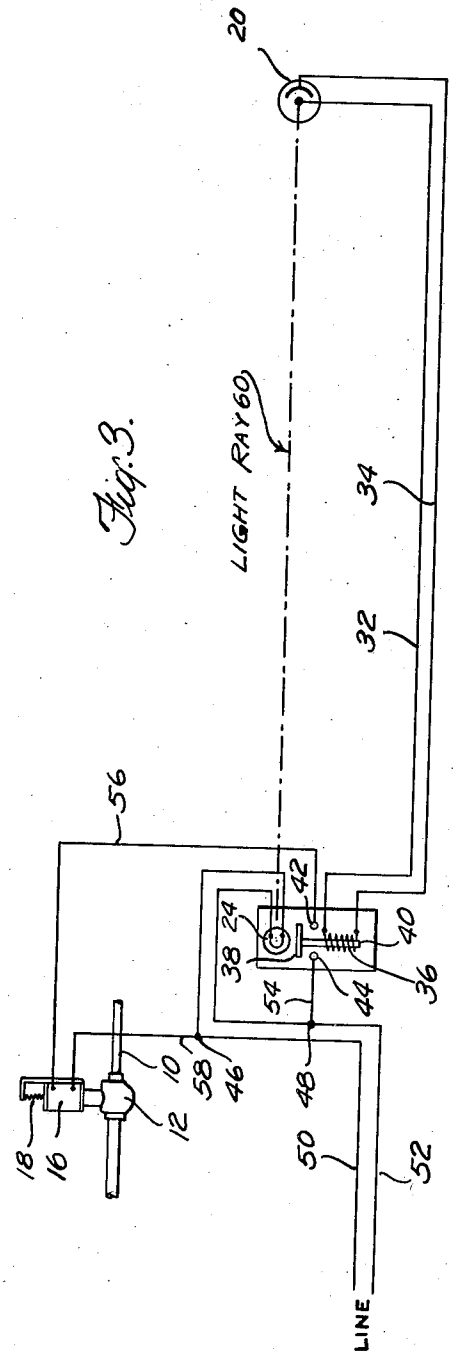


Fig. 3.

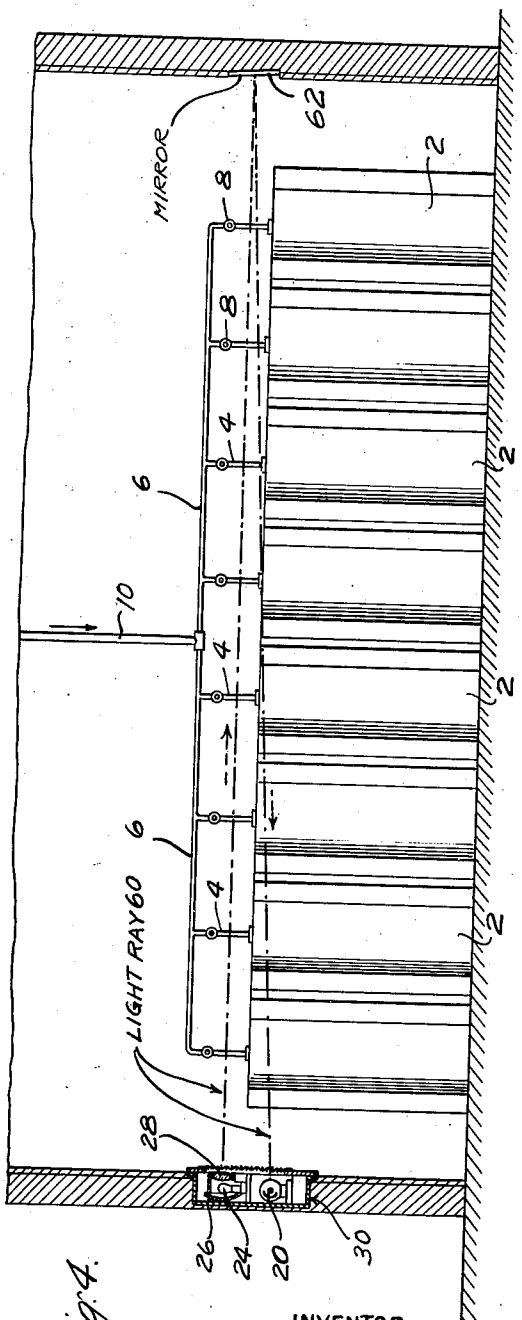


Fig. 4.

INVENTOR
JOHN H. DERBY.
BY
ATTORNEY

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MEANS FOR CONTROLLING THE FLUSHING OF URINALS

John H. Derby, Scarsdale, N. Y., assignor of one-third to C. Milton Wilson and one-third to H. Dorsey Spencer, both of New York, N. Y.

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2 Claims. (Cl. 4—99)

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This invention relates to means for controlling the flushing of urinals, and particularly to means for insuring effective flushing of urinals in the toilet rooms of public buildings, schools, business buildings, athletic clubs, etc.

Many different types of means for controlling the flushing of urinals have been designed and are in use but for the most part these various flush-controlling means do not accomplish the desired ends of maintaining the urinals clean and free from offensive odors. Possibly the most common type in use today, particularly in business buildings and official buildings, is the hand-operated valve intended to be operated by the user of the urinal after using it. This type of control, which is the one most commonly installed, is probably the least effective since most people object to bringing their hands into contact with either the hand-operated lever or the push button usually provided for actuating controlling means of this type after others have had their hands on it. The result is that the urinal is only infrequently flushed. Moreover, such flush controls are expensive to instal and to maintain in operative condition since they require a complete operating unit, including a complicated valve, for each individual urinal.

Foot operated flush controlling means have also proved to be unsatisfactory, although less objectionable to most people to use. One reason for the failure of the foot-operated control is that it must necessarily be placed where it is liable to be rendered inoperative by accumulations of floor dirt mixed with moisture from the urinals. These foot operated controls are, therefore, now rarely seen. This is equally true of those which were intended to be operated by the weight of the urinal user.

In some public buildings attempts have been made to overcome the disinclination of urinal users to use manually operated controls for flushing the individual urinals by providing means for periodic automatic flushing of all urinals in a bank of urinals. These systems have two faults, in that they cause a needless waste of flushing water and in that the flushing does not necessarily occur at the time when it is most needed, this being particularly true in warm weather when decomposition quickly sets in.

A general object of the present invention is to provide semiautomatic means, which are relatively inexpensive to instal and economical in use, for controlling the flushing of urinals, particularly where a plurality of urinals are arranged side by side, and which will operate whenever any urinal is used, without any volition on the part of the user, to effect the flushing of the urinal and which will start this flushing as soon as the user comes into position in front of the urinal and before he starts actual use thereof and will cause the flushing to continue until the user moves away from the urinal. Where the urinal is one of a plurality of urinals, as just suggested, the invention contemplates not only flushing the one that is in use but flushing all of the others at the same time to insure that occasional flushing of each urinal so necessary to prevent odor producing decomposition from continuing, if it has started for any reason in any of those that are not then in use.

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An important feature of the invention is that, without volition on the part of the user of the urinal, the semiautomatic means starts the flushing thereof before the user can begin to use the urinal and thus prevents any accumulation on the urinal surfaces of any decomposable excretions.

Another important feature of the invention is the arrangement whereby the presence of a user before any one of a plurality of urinals arranged side by side will not only cause the flushing of all of the urinals but cause flushing to continue so long as any one of a plurality of users remains in position to use any one of the urinals. This insures effective flushing, without undue use of flushing water, a result rarely, if ever, accomplished when reliance is had upon manual flushing and also not accomplished even by the water wasting periodic automatic flushing, as above pointed out.

Other advantages, important features and objects of the invention to which reference has not hereinabove specifically been made will appear hereinafter when the following description and claims are considered in connection with the accompanying drawings in which—

Figure 1 is a front elevation of a bank of urinals having the semiautomatic flush controlling means of the present invention associated therewith;

Figure 2 is a plan view of the structure shown in Figure 1;

Figure 3 is a wiring diagram showing the arrangement of the various elements of the semiautomatic flush controlling means and the electrical connections therebetween, and

Figure 4 is a view showing a modification of the arrangement shown in Figure 1 to permit the photoelectric cell and the source of illumination

for energizing said cell to be located on the same side of the bank of urinals.

In the embodiment of the invention shown for illustrative purposes only in the drawings, a bank of eight urinals of the vertical wall type commonly to be found in public buildings, office buildings, schools, athletic clubs, etc. is shown, with the urinals arranged side by side in a straight line, each of the urinals 2 of the bank having an intake connection 4 from a manifold 6 to permit flow of flushing water to the urinal, each intake 4 being preferably provided with a flow-controlling valve 8 to permit adjustment of the flow to each urinal so that uniform distribution of the water flowing through the manifold 6 to each urinal 2 of the bank may be obtained. The manifold 6 is in turn connected by a pipe 10 to the water main or building supply, the flow of the water from the water main or building supply being in turn controlled by an electrically operated valve 12.

The valve 12 may be of any suitable commercial type of remote-controlled valve and in its simplest embodiment may comprise a valve stem 14 enclosed within and constituting the movable core of a solenoid coil 16, the valve being impelled toward its seat or closed position either by a spring 18 or merely by gravity and being moved to its open position by energization of the solenoid coil 16, the solenoid coil being so positioned in respect to the valve stem, which is of magnetic material, that the action of the energized solenoid in moving the valve stem to its centralized position in the energized solenoid will effect the opening of the valve.

In the form of the invention shown in Figures 1, 2 and 3, there is located at the right hand side of the bank of urinals, as shown in Figures 1 and 2, a photoelectric cell 20 enclosed within a suitable protective casing or housing 22 having an opening on its left hand side to admit energizing light to the cell 20 and, at the left hand side of the bank of urinals, there is located a suitable source of light for energizing the photoelectric cell such, for example, as an incandescent electric lamp 24 having associated therewith the usual optical accessories, such as a reflector 26 and a lens 28, for directing a beam of light across the space in front of the urinals upon the photoelectric cell 20. The lamp 24 is preferably located in a housing 30 which has the beam directing lens 28 in the right hand side thereof and which also encloses the relay through which flow of operating current to the valve-operating solenoid 16 is controlled.

As shown in the wiring diagram in Figure 3, the photoelectric cell 20 has its terminals connected to the two sides 32 and 34 of an electric circuit which includes a solenoid coil 36 for maintaining the switch member 38 of the relay switch in its open condition as shown. This relay switch may be of any suitable commercial type and is shown in its simplest form in Figure 3 as comprising a stem 40 serving as the movable solenoid core and so related to the solenoid that when the solenoid is energized and the core centered therein the switch member 38 will be held out of circuit closing relation to the contacts or terminals 42 and 44 of the valve operating circuit and thus the solenoid coil 16 of the valve 12 will remain unenergized and the valve will remain in its closed condition.

As shown in Figure 3 of the drawings, the lamp 24, which furnishes the energizing light for the photoelectric cell 20, is connected at 46 and 48 to wires 50 and 52 from the main source of current supply and is thus constantly illuminated. One terminal or switch contact 44 of the normally open circuit through the valve controlling solenoid 16 is connected by a wire 54 to the main wire 52 at 48 and the other terminal or switch contact 42 is connected through wire 56, solenoid 16 and wire 58 to the other main wire 50 at 46. It will thus be seen that if the solenoid 36 becomes deenergized the switch 38 carried on the stem 40 will drop down into bridging relation to the terminals or contacts 42 and 44 and close the circuit through the solenoid 16 thus energizing said solenoid and opening the valve 12.

So long as the beam of light of the lamp 24 impinges upon the photoelectric cell 20 an energizing current, produced by the action of the light on the elements of the photoelectric cell 20, will flow through the circuit comprising the solenoid coil 36, the wires 32, 34 and the elements of the photoelectric cell 20 and the switch member 38 will be held in its circuit breaking position in the valve operating circuit. This beam of light, indicated at 60, is so located in front of the bank of urinals 2 and at such a height above the floor that it will be intercepted by any person who comes into position to use any one of the urinals 2. When this occurs the energization of the photoelectric cell 20 ceases, the current flowing through the circuit including the solenoid 36 ceases and the switch 38 comes into bridging relation to the terminal contacts 42 and 44 and closes the circuit through the solenoid 16, thus opening the valve 12 and causing flushing water to flow through the pipe 10, manifold 6 and each of the intakes 4 to each of the urinals 2 of the entire bank of eight urinals. It will be seen that so long as he or the user of any other urinal stands in beam-intercepting position in front of a urinal the flushing water will continue to flow but that as soon as the last user moves back so that he no longer intercepts the beam the photoelectric cell 20 will again be energized and the solenoid 36 will lift the switch stem 40 and move the switch 38 into its open circuit relation to the terminals or contacts 42 and 44, thus opening the circuit through the solenoid 16 and permitting the valve 12 again to close and thus shut off the flushing water.

In the modified arrangement of the relay elements shown in Figure 4 of the drawings, both the light source 24 and the photoelectric cell 20 are located upon the same side of the bank of urinals, that is, upon the left hand side as shown in Figure 4, and the light is reflected back from the light source to the photoelectric cell by means of a mirror 62 located on the right hand side of the bank of urinals. It will be obvious that any interruptions of the reflected beam will have the same effect as interruption of the direct beam.

What is claimed as new is:

1. In semi-automatic means for controlling the flushing of urinals, the combination with a plurality of individual urinals arranged side by side, and means associated with each for directing flushing water thereover and therethrough, of manifold connections from said flush-directing means to any suitable supply of flushing water, an electrically operable valve between said manifold and said flushing water supply for controlling the simultaneous flow of water to all of said flush-directing means, a relay-controlled electric circuit for opening said valve and relay governing means arranged to be actuated by the presence of a user of any one of said urinals in position

to make use thereof, said relay governing means being arranged to maintain said valve in open condition to effect flushing of all of said urinals so long as the user remains in the aforementioned position and being so located as to insure such flushing flow before use of any urinal can take place.

2. Semi-automatic means for controlling the flushing of urinals according to claim 1 in which the relay governing means comprise a photoelectric cell, an electric circuit in which said cell and relay are included and light means for energizing said cell, said cell and said light means being so arranged in relation to the row of urinals that the user of any one of said urinals must intercept the energizing light beam whenever he moves into and so long as he remains in a position where use of the urinal can be made.

JOHN H. DERBY.

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