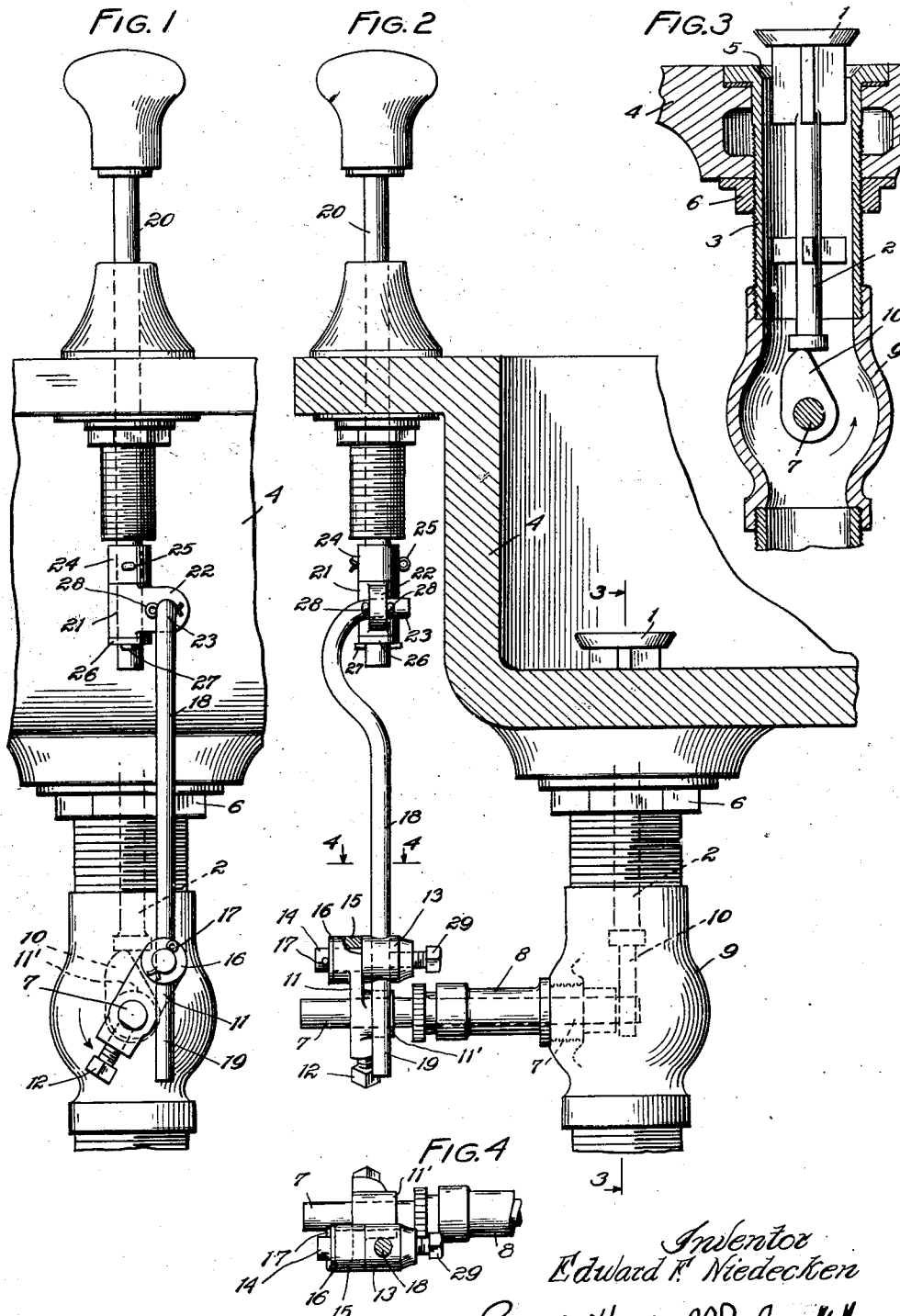


April 6, 1926.

1,579,564

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VALVE ACTUATING MECHANISM

Filed June 18, 1925



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Patented Apr. 6, 1926.

1,579,564

UNITED STATES PATENT OFFICE.

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VALVE-ACTUATING MECHANISM.

Application filed June 18, 1925. Serial No. 37,999.

To all whom it may concern:

Be it known that I, EDWARD F. NIEDECKEN, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Valve-Actuating Mechanism, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates to improvements in valve actuating mechanism of the type having a dead-center position which is passed in effecting movement of the valve to open position whereby the latter and said mechanism are held against return movement due to any pressure which might be brought to bear upon the valve, and more particularly to means for providing a stop to limit the valve-opening movement of the mechanism to a predetermined position beyond its dead-center position.

Waste valves, such as are used for opening and closing the drain or outlet openings of bathtubs, wash basins and the like, are generally provided with manually-operable mechanism adapted to actuate the valve. This mechanism in some cases has comprised, in general, a shaft having one end thereof journaled in and extending into the drain or outlet pipe, and a cam fixed to this end of the shaft and adapted to engage with the lower end of the valve stem to effect opening and closing movement of the valve upon rotation of the shaft, the valve moving vertically in the drain pipe and seating upon the upper end thereof. It has been the practice to so arrange the cam that it has a dead-center position with respect to the valve in effecting opening movement thereof, the drain pipe being provided with a suitable lug or stop adapted to engage or coact with the cam when it passes slightly beyond this dead-center position whereby the weight of the valve and the pressure of the outflowing water thereon cannot cause movement of the cam in the opposite direction to permit the valve to close, the weight of the valve and the pressure of the water thereon, on the contrary, urging the cam against the stop and thereby tending to hold it in position to hold the valve open. The shaft to which the cam is fixed is provided at its outer end with a crank arm and a

manually-operable member connected thereto and extending upwardly through the back edge or shelf of the basin within convenient reach. The crank arm fixed to the outer end of the shaft is so arranged that when the cam is moved slightly past its dead-center position and engages the stop in the drain pipe during the valve-opening movement of the mechanism, the crank arm is an appreciable distance forward of its dead-center position so that upon downward movement of the manually-operable member the shaft is rotated in an opposite direction to effect closing of the valve. It has, therefore, been necessary to adjust the angular relation of the crank arm and the cam with a certain amount of precision, as well as the relation of the stop in the drain pipe with respect to the cam, so that the latter engages the stop when it is slightly beyond its dead-center position and before the crank arm reaches a dead-center position. This construction has not been entirely satisfactory for the reason that in properly setting up the valve and actuating mechanism thereof, a certain amount of skill and experience is necessary in effecting adjustment of the various parts so that the device works properly. Although the valve and its actuating mechanism may be properly installed, it has been found that certain of the parts tend to work loose in the course of time and cause the actuating mechanism for the valve to get out of adjustment and become inoperative. One of the objects of the present invention, therefore, is to provide improved valve actuating mechanism of the character referred to above which in and of itself provides a stop for the cam when it passes slightly beyond its dead-center position in opening the valve, which requires no skill or experience to manufacture and install, which maintains its adjustment at all times, which is simple in construction, and which may be manufactured at a comparatively small cost. Other objects and advantages will hereinafter appear.

In the drawings:

Figure 1 is an end elevation;

Fig. 2 is a side elevation, partly in section;

Fig. 3 is a section on line 3—3 of Fig. 2; and

Fig. 4 is a section on line 4—4 of Fig. 2.

The valve 1 is provided with a stem 2 and moves vertically within the drain or outlet pipe 3 fitted in the outlet opening of the wash basin 4, the upper end of the pipe providing a valve seat 5 for the valve, and being held in position by a nut 6 screwed thereon. A shaft 7 is journaled in a bearing member 8 secured to the connection 9 which is screwed to drain pipe 3 and forms part of the latter, one end of the shaft extending into the interior of connection 9 and being provided with a cam 10 having a press fit thereon, the cam being arranged to engage the lower end of stem 2 of the valve to effect opening and closing movements of the latter upon rotation of shaft 7 in the proper direction. A crank arm 11 having a hub 11' is fixed to the outer end of shaft 7 and so arranged with respect to cam 10 that when the latter is moved slightly beyond its dead-center position upon valve-opening movement of shaft 7 in the direction of arrow shown in Figs. 1 and 3, the crank arm will be an appreciable distance forward of its dead-center position. Downward movement of the manually operable member connected to crank arm 11 is thus permitted to cause rotation of shaft 7 and cam 10 fixed thereto in the opposite direction to permit valve 1 to close by its own weight. Crank arm 11 may be adjusted along shaft 7 to meet varying conditions and fixed against rotation with respect thereto by any suitable means such as a set screw 12 screwed into hub 11' and engaging shaft 7.

The parts of the valve actuating mechanism which engage or coast with each other to provide a stop when cam 10 is moved slightly beyond its dead-center position in opening valve 1, and which act to hold the cam in this position, will now be described. A member 13 is provided with a reduced end portion 14 extending loosely through an opening in the free end 15 of crank arm 11, and is held in position by means of the washer 16 arranged upon end 14 and a cotter pin 17 extending therethrough. Member 13 is provided with a transverse opening through which rod 18 passes, the lower end 19 of the rod being extended beyond member 13 and engaging hub 11' of the crank arm 11, as shown in Figs. 1 and 4, when the latter is rotated a sufficient amount in the direction of the arrow to move cam 10 slightly beyond its dead-center position, as shown in Fig. 3. It will thus be seen that certain of the parts of the valve actuating mechanism, namely, the lower end 19 of rod 18 and hub 11' of crank arm 11, in and of themselves provide a stop for limiting movement of cam 10 to a predetermined position beyond its dead-center position for the purpose explained above, thereby holding the cam in this pre-determined position against

further movement in the direction of the arrow in Fig. 3.

A rod 20 is slidably mounted in any suitable manner in the back edge or shelf of basin 4, as shown, and provided at its lower end with a collar 21 having an apertured lug 22 through which the upper end 23 of rod 18 loosely passes, as shown in Fig. 2, collar 21 being held in fixed axial relation with respect to rod 19 by means of a collar 24 arranged on rod 19 above collar 21, a cotter pin 25 extending through collar 24 and the rod, a washer 26 arranged upon rod 19 below collar 21, and a cotter pin 27 extending through the rod below washer 26. Cotter pins 28 pass through the upper end 23 of rod 18 on either side of lug 22, as shown, to hold these parts in proper assembled relation. The collars 21 and 24 and cotter pins 25, 27 and 28 provide simple means for connecting the lower end of rod 20 to the upper end 23 of rod 18, and after once being assembled, as shown and described, cannot work loose, but remain in proper adjusted position for all time. In installing the valve and actuating mechanism therefor, rod 18 is inserted through the opening in member 13 and crank arm 11 rotated in the direction of the arrow in Fig. 1 until cam 10 is in the position shown in Fig. 3, slightly beyond its dead-center position. Rod 18 and member 13 are then fixed against relative movement with respect to each other by means of a set screw 29 screwed into the large end of member 13 and engaging the rod. The actuating mechanism for the valve may thus be quickly and accurately adjusted and fixed permanently in adjusted position.

From the foregoing it will be seen that an improved valve actuating mechanism of the character referred to above has been provided in which certain of the parts comprising the mechanism are adapted and arranged for engagement or coaction with each other to provide a stop when the mechanism is moved slightly beyond its dead-center position in opening the valve, and that the improved mechanism has advantages over those used heretofore as regards simplicity of construction and operation, and ease with which the same is set up or installed.

Although the lower end 19 of rod 18 and hub 11' of crank arm 11 have been shown and described as providing a stop for holding cam 10 in a predetermined position beyond its dead-center position for the purpose explained, it is to be understood that the invention is of much broader adaptation and that other parts of the valve actuating mechanism may be adapted and arranged for engagement or coaction with each other for this purpose, and that various changes in the size, shape and arrangement of the parts

may be made without departing from the spirit of the invention or the scope of the claims.

The invention claimed is:

5 1. The combination with a valve, of actu-
ating mechanism therefor having a dead-
center position which is passed during valve-
opening movement of the latter and includ-
ing a plurality of parts connected for rela-
10 tive movement with respect to each other,
certain of said parts being adapted and ar-
ranged for engagement with each other
when said mechanism reaches a predeter-
mined position beyond said dead-center po-
15 sition whereby said mechanism is held in said
predetermined position and said valve held
open.

2. The combination with a valve, of actu-
ating mechanism therefor having a dead-
20 center position which is passed during valve-
opening movement of the latter and com-
prising a plurality of parts connected for
relative movement with respect to each other,
said parts including a shaft, a crank arm
25 fixed to said shaft, and an actuating mem-
ber connected to said crank arm, said actu-
ating member being adapted and arranged
for engagement with one of said parts when
said mechanism is in a predetermined po-
30 sition beyond said dead-center position where-
by said mechanism is held in said predeter-
mined position and said valve held open.

3. The combination with a valve, of actu-
ating mechanism therefor having a dead-
35 center position which is passed during valve-
opening movement of the latter and com-
prising a plurality of parts connected for
relative movement with respect to each other,
said parts including a shaft, a crank arm
40 fixed to said shaft, a member pivotally
mounted in the free end of said crank arm
and provided with a transverse opening, and
a manually-operable rod having one of its
ends extending through said opening in said
45 member and fixed against relative movement
with respect to the latter, said end of said
rod extending beyond said member and be-
ing adapted and arranged for engagement
with one of said parts when said mechanism
50 reaches a predetermined position beyond said
dead-center position whereby said mecha-
nism is held in said predetermined position
and said valve held open.

4. The combination with a valve, of actu-

ating mechanism therefor having a dead- 55
center position which is passed during valve-
opening movement of the latter and compris-
ing a plurality of parts connected for rela-
tive movement with respect to each other,
said parts including a shaft, a crank arm 60
fixed to said shaft and provided with a hub,
and an actuating member connected to said
crank arm, said actuating member being
adapted and arranged for engagement with
said hub when said mechanism is in a pre- 65
determined position beyond said dead-center
position whereby said mechanism is held in
said predetermined position and said valve
held open.

5. The combination with a valve and a 70
cam for effecting opening and closing move-
ments thereof, said cam having a dead-
center position which is passed during valve-
opening movement of the latter, of operat-
ing mechanism associated with said cam and 75
including a plurality of parts connected for
relative movement with respect to each other,
certain of said parts being adapted and ar-
ranged for engagement with each other
when said cam reaches a predetermined po- 80
sition beyond said dead-center position where-
by said cam is held in said predetermined
position and said valve held open.

6. In combination, a valve, and actuating 85
mechanism therefor comprising a shaft pro-
vided with a cam adapted to effect opening
and closing movements of said valve upon
rotation of said shaft, said cam having a
dead-center position which is passed during
valve-opening movement of said shaft, a 90
crank arm fixed to said shaft, a member
pivotally mounted in the free end of said
crank arm and provided with a transverse
opening, and a manually-operable rod hav- 95
ing one of its ends extending through said
opening and fixed against relative movement
with respect to said member, said end of
said rod being adapted and arranged for
engagement with one of said parts of said 100
mechanism when said cam reaches a pre-
determined position beyond said dead-center
position whereby said cam is held in said
predetermined position and said valve held
open.

In witness whereof I hereto affix my sig- 105
nature.

EDWARD F. NIEDECKEN.