

C. J. E. CARLSON.
CHECK VALVE FOR SEWERS.
APPLICATION FILED OCT. 29, 1909.

961,286.

Patented June 14, 1910.

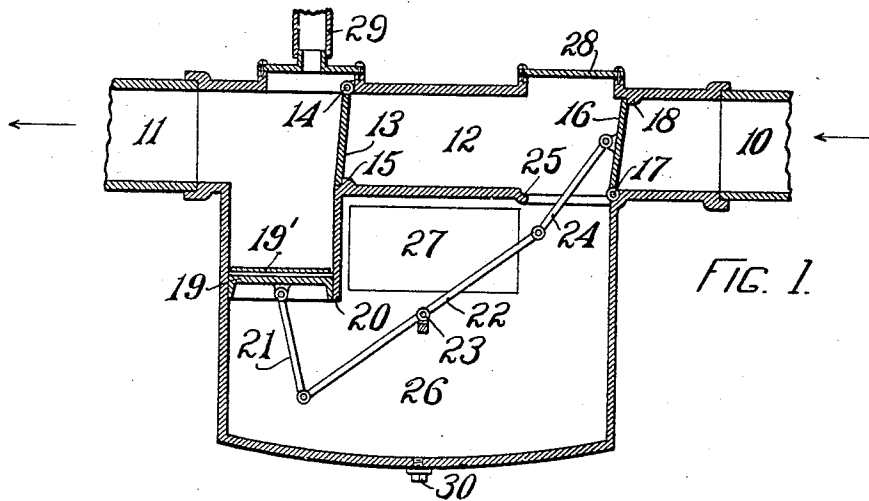


FIG. 1.

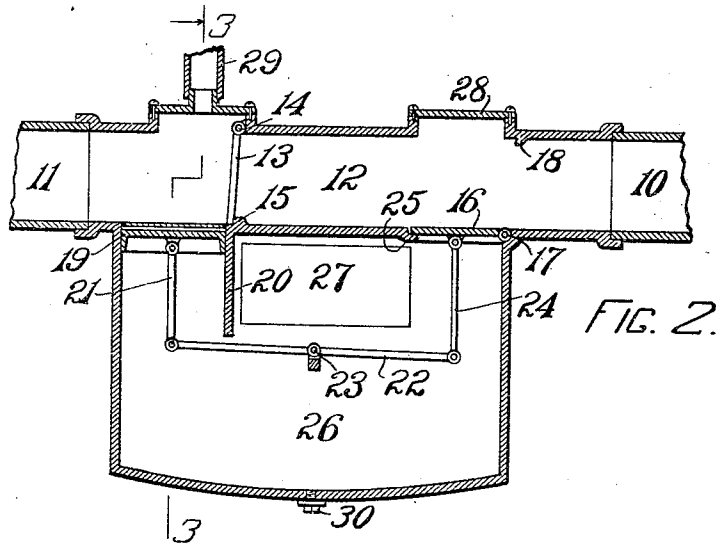


FIG. 2.

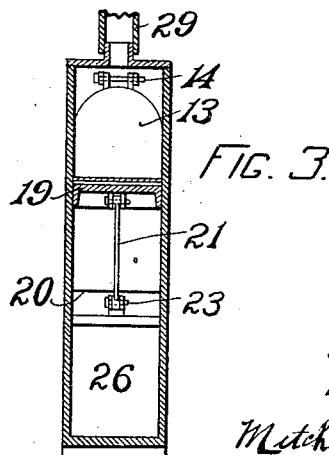


FIG. 3.

WITNESSES

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CHECK-VALVE FOR SEWERS.

961,286.

Specification of Letters Patent. Patented June 14, 1910.

Application filed October 29, 1909. Serial No. 525,270.

To all whom it may concern:

Be it known that I, CARL J. E. CARLSON, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented new and useful Improvements in Check-Valves for Sewers, of which the following is a specification.

This invention relates to check valves for sewers.

More particularly it relates to valves for preventing water from backing up into the basements of buildings when the street sewer becomes filled from excessive rains or other flood conditions. The only valve for this purpose hitherto known, so far as I am aware, is an ordinary check valve, hinged at the top and normally maintained closed by gravity. In localities where the land is low or is level and the sewer pipes have insufficient capacity or pitch, the water sometimes rises toward and even stands above the street level for a period. In cases where a single street drain is used for carrying off the surface water of the streets and also the discharges from the sewer pipes of the houses, matter washed down from the streets and floating in the water finds its way into the outlet pipes from the houses and lodges under the check valves, so that such a check valve, as above described, does not close and is ineffective. This may happen during ordinary cases, which most frequently happen, in which the water is backed up in the sewer but does not rise to the street level. When a considerable flood subsequently occurs, in which the use of the check is really needed, the check is inefficient and fails to close; and the water enters, fills the pipes, and overflows from the fixtures into the basement, until it stands at the same level therein as it stands in the street outside.

It is the object of the present invention to provide a more effective check for use on such occasions.

One embodiment of the invention is illustrated in the accompanying drawings in which—

Figure 1 represents vertical medial section through apparatus embodying the invention, showing the valve closed as under the extraordinary flood conditions, above mentioned. Fig. 2 shows the same with the parts in the positions they assume under ordinary condi-

tions, and Fig. 3 is an end elevation, in section on the line 3—3 of Fig. 2.

Referring to the drawings, particularly to Fig. 2, 10 indicates sewer pipe leaving a building and 11 is its continuation by which its contents reach the main sewer in the street. The apparatus between is an embodiment of the invention, in which a passage 12 is provided equipped with a check valve 13, of any ordinary or suitable type, hinged at its top 14 and seating against a shoulder 15 at its bottom. Under normal conditions sewage passes out through the passage 10, 12 and 11, opening valve 13 as much as necessary on its way.

An automatic cut-off valve 16 is provided in the passage 12, hinged at its bottom at 17 and adapted to seat against a shoulder 18 at the top. Under extraordinary conditions this valve is operated by plunger 19, which fills an opening in the bottom of passage 12 located on the street side of valve 13. A cylinder 20 extends downward in which the plunger fits. The plunger is connected with valve 16 by linkage comprising the plunger rod 21; connecting rod 22, pivoted at 23; and the link 24. When the plunger 19 descends, link 24 rises and lifts and closes valve 16. Under these circumstances the parts assume the position shown in Fig. 1. The plunger 19 should be sufficiently tight with packing 19' or otherwise so that leakage of water through cylinder 20 will be prevented. The valve 16, when occupying the position shown in Fig. 2, rests upon a seat 25, and preferably is tight enough thereon so that leakage of water is prevented from 12 into the chamber 26 underneath, in which the linkage above described is located. The plunger 19 is also preferably somewhat larger in area than the valve 16. Hand hole 27 is provided for the chamber 26, and hand hole 28 over the valve 16. An air vent 29 is provided on the street side of valve 13; and a drainage outlet 30 is provided in the bottom of the chamber 26.

The operation of the device is as follows. Under ordinary conditions, the apparatus stands as shown in Fig. 2 and matter flowing out from the house passes over valve 16, which lies on the bottom of passage 12 and forces its way past check valve 13, which is hinged at the top and yields before

it; and flows over the plunger 19 and on into the street main sewer. If the street sewer becomes filled with water to such a level that water backs into pipe 11, this flow of water should be stopped by check valve 13, but for reasons hereinbefore explained, this type of valve is not reliable. However, the weight of water forced back into pipe 11, with the head or pressure resulting from the elevation of water in the street, forces plunger 19 down, thus raising and closing valve 16. Such water as leaks past valve 13 can then pass no farther than the chamber 26. When the level of water in the street falls, the water remaining inside of valve 16 presses against that valve and its weight is added to the weight of the valve and linkage to overbalance the weight of plunger and linkage and such water as is contained in cylinder 20 above the plunger. After the water has subsided, the parts might also be returned to their original position by hand, if preferred, by removing the hand hole 27, through which also water in chamber 26 may be removed by pump, or if the drainage conditions permit, the water may be allowed to run out through the drain 30 and seep away. The valve 16 is prevented from becoming clogged by foreign matter floating in from the outside by back water, partly by the fact that the valve 13 intervenes between it and the street so that such floating matter is stopped and deposited at the valve 13 and does not reach inward to the valve 16, and partly by the fact that the valve 16 closes at the top out of the reach of any deposits which might pass valve 13.

It will be obvious that modifications of the specific mechanism and construction herein shown, and other applications of the invention herein disclosed, may be made without departing from the scope of the invention.

I claim:

1. Apparatus comprising a passage having a valve; a chamber, closed to the passage and having a movable wall exposed in the passage; and linkage connecting said movable wall and the valve, whereby recession of the wall closes the valve.

2. Apparatus comprising a passage having a valve; a chamber, closed to the passage and having a movable wall exposed in the passage; and linkage connecting said movable wall and the valve, whereby recession of the wall closes the valve; there being also a check valve in the passage between the place of exposure of said wall and the first mentioned valve.

3. Apparatus comprising a passage having a valve hinged at the bottom; a chamber, closed to the passage and having a movable wall exposed in the passage; and linkage

connecting said movable wall and said valve, whereby recession of the wall raises the valve.

4. Apparatus comprising a passage having a valve hinged at the bottom; a chamber, closed to the passage and having a movable wall exposed in the passage; and linkage connecting said movable wall and said valve, whereby recession of the wall raises the valve; there being also a check valve in the passage between the place of exposure of said wall and the first mentioned valve.

5. Apparatus comprising a passage having two check valves, each controlled by gravity, one being normally open and the other being on the discharge side of the first mentioned valve and normally closed; and there being a chamber, closed to the passage and having a movable wall exposed in the passage on the discharge side of both valves; and means whereby movement of said wall actuates and closes the first mentioned valve against gravity.

6. Apparatus comprising a passage; a chamber communicating with the passage; a valve adapted to close the passage, and adapted when not closing the passage to close said communication with the chamber; there being a movable wall of the chamber exposed in the passage; and linkage connecting said wall and valve, whereby they tend to counterbalance each other and movement of one actuates the other.

7. Apparatus comprising a passage; a chamber communicating with the passage; a valve adapted to close the passage and adapted when not closing the passage to close said communication with the chamber; there being a movable wall of the chamber exposed in the passage; and linkage connecting said wall and valve, whereby they tend to counterbalance each other and movement of one actuates the other; the area of exposed movable wall exceeding the area of said valve which is exposed to the passage when the passage is open.

8. Apparatus comprising a sewer pipe and a chamber thereunder communicating therewith; a valve in the pipe hinged at the bottom of the pipe and adapted to close the pipe or to close said communication; a plunger, forming part of the wall between the chamber and pipe and being exposed in said pipe on the discharge side of the valve; and linkage connecting the plunger and valve, whereby expulsion of the plunger from the pipe closes said valve in the pipe.

Signed by me at Minneapolis, county of Hennepin, State of Minnesota, this 20th day of October, 1909.

CARL J. E. CARLSON.

Witnesses:

ADOLF ANDERSON,
LEE A. TANNEHILL.