C. H. DODD & R. J. McNULTY.

REGULATOR VALVE FOR SEWERS.

APPLICATION FILED OCT. 8, 1909.

993,587. **Patented May 30, 1911.**

3 SHEETS—SHEET 1.

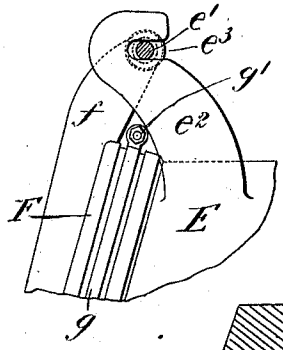


Fig. 1a

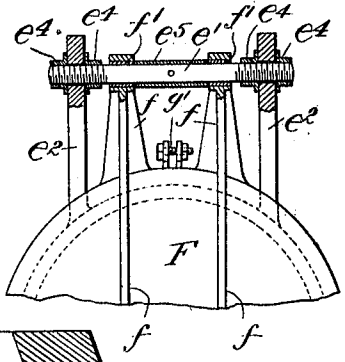
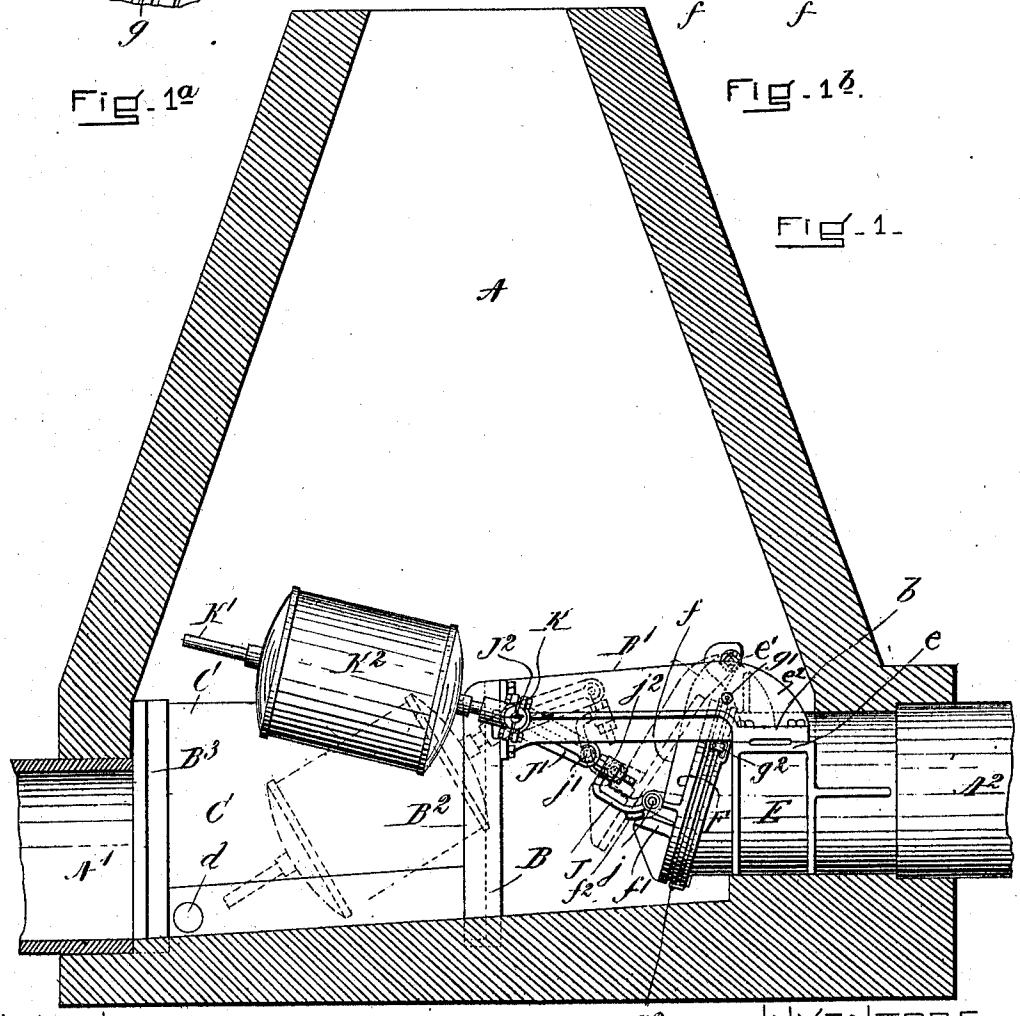


Fig. 1b.

Fig. 1.



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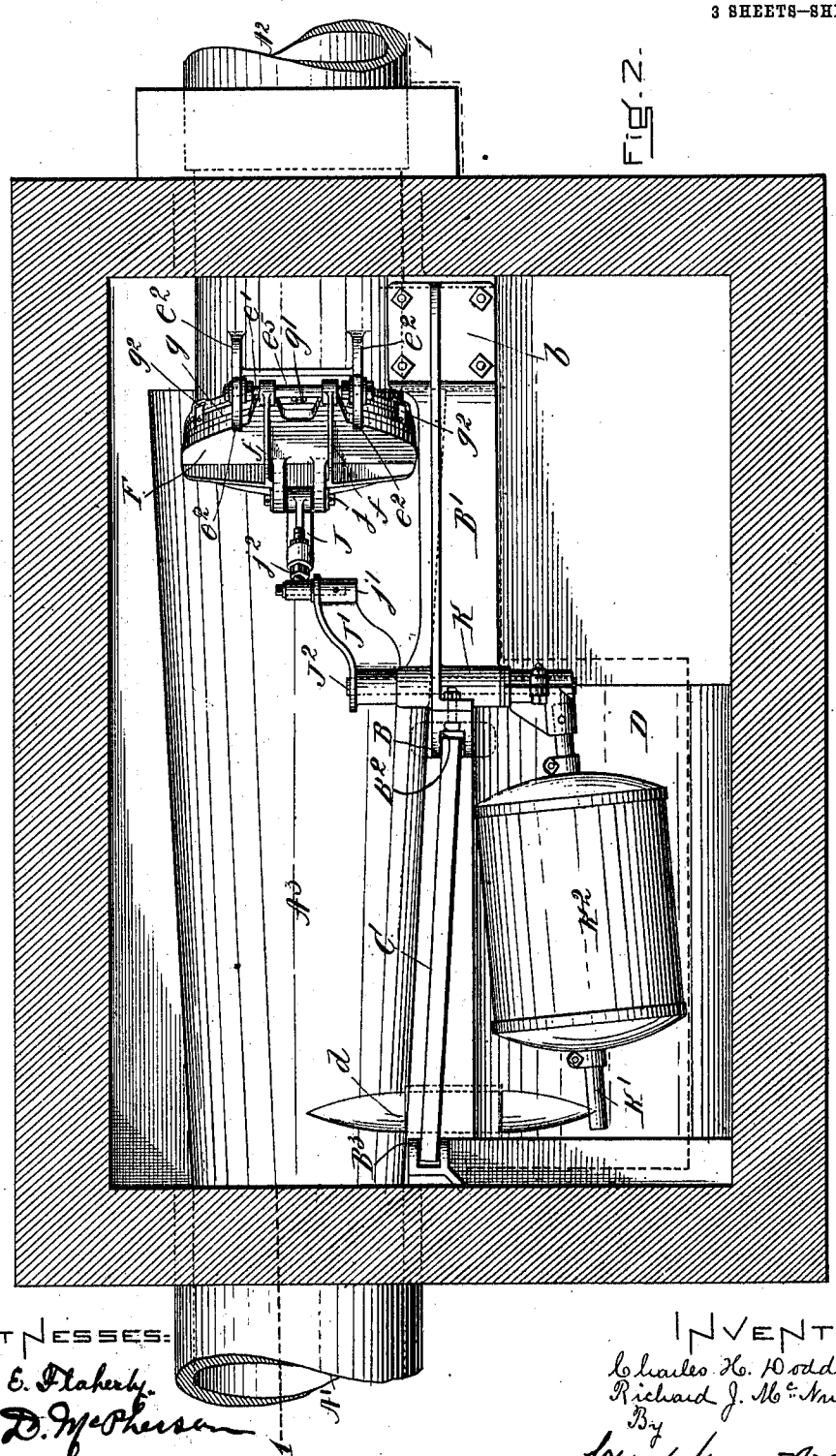
3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

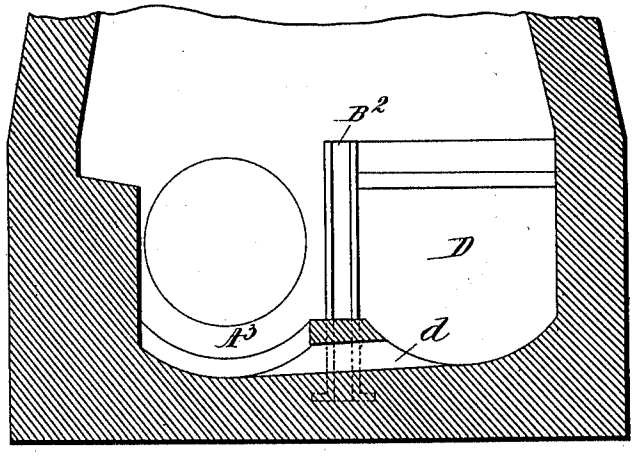

Fig. 3.

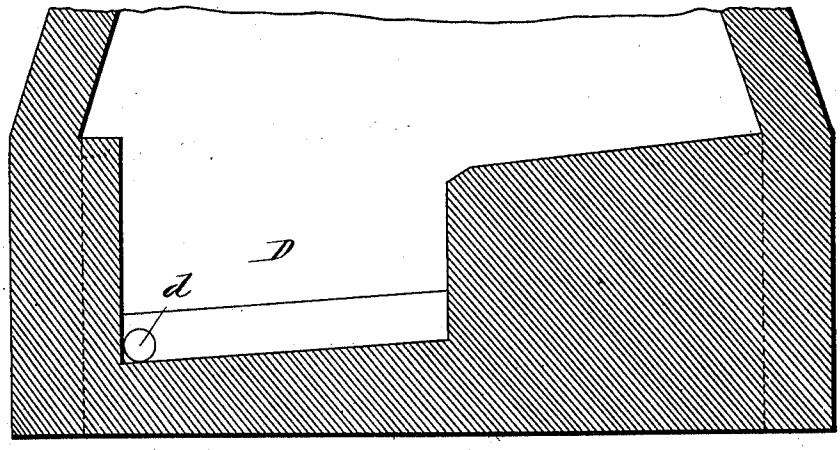

Fig. 4.

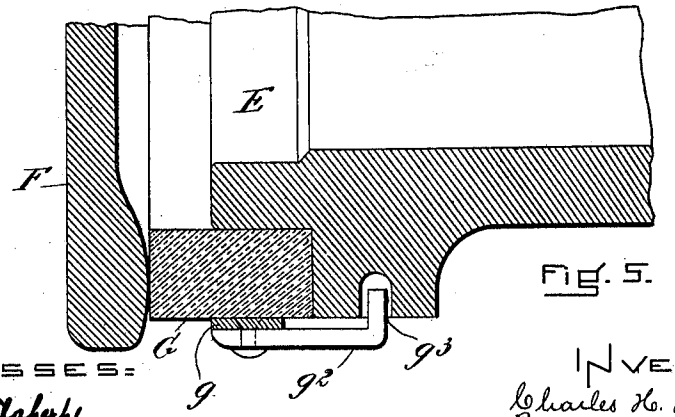

Fig. 5.

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UNITED STATES PATENT OFFICE.

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REGULATOR-VALVE FOR SEWERS.

993,587. Specification of Letters Patent. Patented May 30, 1911.

Application filed October 8, 1909. Serial No. 521,665.

To all whom it may concern:

Be it known that we, CHARLES H. DODD and RICHARD J. McNULTY, both of Boston, in the county of Suffolk and State of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Regulator-Valves for Sewers, of which the following is a specification.

There are occasions when, owing to storm conditions or other reasons, branch sewers discharge too heavily into the main sewers. Automatic regulator valves placed at the junction of main and branch sewers have been used for the purpose of preventing this, but so far as we know the best of those heretofore used are defective and troublesome in practice and but partially carry out the purpose for which they are designed. A valve or gate of this class which has been most frequently used has been hung upon a rocking arm, being constructed on the arc of a circle to fit a corresponding arc formed at the end of the inlet to the man-hole in which such gate was placed, the gate being operated by a float the position of which was governed by the level of the water in the man-hole or other enlargement of the sewer built to contain such apparatus. A difficulty with such a gate lies in the fact that in order to make a tight joint it must be set with great accuracy so that the center about which it is moved may coincide with the center upon which the end of the inlet nozzle of the sewer is constructed and, while a certain amount of adjustment is always possible, if the fit is close enough to prevent leakage friction will prevent the gate opening at the time when relief should occur. Owing to the character of the design, expert labor is necessary for subsequent as well as shop adjustment which adds unreasonable cost to great inconvenience. Moreover there is a constant grinding and wedging, as such a gate comes into use, between the gate and the end of the nozzle pipe so that within a comparatively short time the gate becomes imperfect as a shut-off. This gate as well as the seat upon which it slides must have machined or finished surfaces, and as finished surfaces are especially liable to attack from the acids which the sewage contains, a few years' exposure to their action results in much corrosion and a softening of the iron to such a degree that the surface may be easily penetrated by a pen-knife. Moreover, these expensively machined surfaces of the present gate, after being softened by the acids, are worn quickly by the sand and grit carried by the sewage. The leakage then becomes excessive, and to make the gate about as tight as when installed entails an expense which is a large and disproportionate percentage of the original cost; in fact a new nozzle and gate is the practical remedy. Another fault with this design arises from the position on the floor of the man-hole of the cast-iron well in which the operating float is placed. A float-well is necessary to protect the float from the violent vertical agitation or wave motion of the sewage as it is discharged through the regulator nozzle into the man-hole as such wave motion tends to vibrate the float and cause the gate to move up and down instead of closing and remaining closed. This iron well divides the flow of sewage through the man-hole, and during the dry weather flow, on account of the large area of flat floor necessary about the base of the well, large deposits of sludge accumulate through which the light flow makes its channels. This putrefying deposit causes stenches which rise to the street and cause public complaint.

Our invention is intended to overcome the above mentioned and other faults in such valves, and it will be understood from the drawings showing an apparatus in which it is embodied.

As we construct our well on the side we are able to provide an unobstructed and direct flow in a curved invert through the man-hole, and we know by experience that this will prevent the sludge deposit. The bottom of our well may be so constructed that it will drain freely and quickly. We have avoided finished surfaces in both our gate and nozzle castings and they come from the foundry and shops with the acid-resisting, chilled and sand-scale surfaces intact. There is no sliding motion with its many troublesome accompaniments in closing, the gate seating itself upon the rubber valve seat which we have found will last in sewers for many years without noticeable deterioration.

Our gate will last indefinitely without wear, and renewal is not costly. The gate seat and nozzle are practically indestructible. If slight adjustment should become necessary at long periods it is made simply and quickly by turning the nuts on one of the

link arms. Our regulator will regulate positively and effectively with practically no trouble or expense after its installation and will always remain tight under head.

In the drawings is shown apparatus embodying our invention.

Figure 1 is a section on line 1—1 of Fig. 2, showing our apparatus in elevation, the moving parts being closed, their open positions being shown in dotted lines. Figs. 1^a and 1^b show details of the gate hinge. Fig. 2 is a plan of our apparatus, the man-hole in which it is located being shown in horizontal section. Fig. 3 is a cross section, showing the contour of the bottom of the man-hole. Fig. 4 is a longitudinal section taken through the well for the float, and Fig. 5 is an enlarged detail of the gate seat.

We have shown at A a man-hole chamber which may be of any desired shape and which contains a post B suitably braced by the beam B^1 and carrying a slideway B^2 which coöperates with a casting having a corresponding slideway B^3 in the side of the chamber for the reception of a partition C. This partition serves to form a chamber D which, however, is connected with the main channel of the chamber by a connecting pipe or channel *d* so that the level in the chamber D will always equal the level of the chamber A through which the sewage normally flows.

A^1 is the connection with the main sewer, A^2 the connection with the branch sewer, and A^3 a gutter connecting these connections. The post B and beam B^1 are bolted together and the farther end of the beam B^1 carries a plate *b* which rests upon the upper part of a web *e* forming part of the nozzle E which is connected with the branch connection A^2 and carries the valve and valve seat. By means of this web and the beam B^1 the nozzle E is firmly held in place being more or less embedded in concrete as may be desired. The gate or valve F is hung by arms *f* from a hinge rod or pin e^1 supported upon arms e^2 mounted on the nozzle E. The upper end of each arm e^2 is slotted as at e^3 to receive the hinge rod or pin e^1. This pin is threaded at each end and carries nuts e^4 which nuts may be screwed against each side of the arms e^2 so that the position of the rod may be adjusted when the apparatus is first being put into place to form a properly located center for the valve F. A sleeve e^5 is located on the pin e^1 between the arms *f*, and bushings f^1 are preferably used in the openings in the arms *f* through which the rod e^1 passes.

The gate or valve F is hinged to fall against a seat comprising a rubber ring G on the end of the nozzle and for the purpose of supporting this seat in place a flexible metallic ring *g* is used the ends of which are drawn together by a bolt g^1. This flexible ring is provided with angular lugs g^2 which fit into suitable sockets g^3 in the end of the nozzle or outlet so that in putting this apparatus together the gasket is first slipped into place; the ring is then applied about the gasket with the ends of its lugs in their appropriate sockets, and the nut on the bolt is then screwed tight to clamp the ring and gasket about the end of the nozzle E.

The gate F is operated through the instrumentality of two toggle arms, one J being pivoted at *j* to the gate and at its other end at j^1 to the other toggle arm J^1 which is carried by a rock shaft J^2 mounted in bearings K on the beam B^1. By means of a turnbuckle j^2 the length of the arm J may be adjusted as occasion may require, it being preferable that the toggle should never come into a straight line; otherwise there would be difficulty in opening the gate. A boss f^1 cast on the outside of the gate F coöperates with a corresponding part f^2 of the toggle arm J to keep the pivots *j*, j^1 and J^2 out of a straight line. The rock shaft J^2 carries at its outer end an arm K^1 on which is adjustably carried an ordinary float K^2 which lying within the chamber D rises and falls according to the level of the water within the chamber, the construction of these parts being such that when the float has been raised to a certain height, through the instrumentality of the rock shaft and connecting parts the gate will be closed against the rubber seat and the higher the float rises the more directly the toggle arms press the gate against the seat and the less chance there is for leakage from the branch sewer into the chamber. The float is adjustable on its arm and the arm is adjustable about the rock shaft J^2 so that ample adjustability is given to meet all requirements.

It will be seen that as our gate is mounted on an adjustable hinge pin or rod and is closed by a float operating in an independent float chamber and acting through a toggle which never becomes actually straight, it is possible, first, to increase its durability, second, to economize in the cost of the apparatus for the reason that a finished joint is not necessary between the gate and its seat so that the parts never have to be machined, third that the various parts may be adjusted, and fourth, that the float itself being located in a special chamber or well disconnected from either the inlet or outlet pipe may be protected from any rapidly intermittent changes of level or waves in the current.

What we claim as our invention is:—

1. The regulator valve above described, comprising a nozzle, a gate, and means for supporting said gate comprising two arms mounted on said nozzle, each arm being slotted, a hinge rod adjustably mounted in said

slots to form a hinge for said gate whereby said gate may be adjusted on an axis transverse to the length of said nozzle, as well as toward and from said nozzle, in combination with means for operating said gate.

2. The regulator valve above described comprising a nozzle, a gate hinged thereto, a float and means comprising toggle arms connecting said float and said gate whereby the movement of said float will operate said gate to open or close it, the length of one of said toggle arms being adjustable whereby the operative level of the float to close the gate may be determined.

3. The regulator valve above described comprising a nozzle, a gate hinged thereto, a float and means comprising toggle arms connecting said float and said gate whereby the movement of said float will operate said gate to open or close it, the length of one of said toggle arms being adjustable whereby the operative level of the float to close the gate may be attained, and said gate being provided with a boss adapted to engage with a corresponding portion of one of said toggle arms and receive pressure therefrom to assist in closing the gate.

4. In a regulator valve, a nozzle, a gate for closing it and means for operating said gate comprising a rock shaft connected thereto, means for supporting said rock shaft comprising a post, a brace and means forming part of said nozzle whereby said brace is supported, said post having a slideway in combination with a second post having a corresponding slide-way, said slideways being adapted to receive a partition, as and for the purposes set forth.

5. In a regulator valve, in combination, a nozzle, a gate for closing it, and means for operating said gate comprising a rock shaft connected thereto, means for supporting said rock shaft comprising a post, a brace, and means forming part of said nozzle whereby said brace is supported, said post having a slideway, in combination with means coöperating with said slideway adapted to support a partition as described.

6. In a regulator valve setting, a nozzle having a web extending from one side thereof, a frame secured to said web and comprising a post, a beam connecting said web and said post, a gate for closing said nozzle, a rock shaft carried by said frame, and means connected to said rock shaft whereby said gate shall be operated.

7. In a regulator valve setting, a chamber having an inlet at one end and an outlet at the other, means for closing said inlet, a float for operating said closing means, a well for said float located at the side of said chamber and out of line with said outlet, and a channel of relatively restricted area connecting said well with the bottom of said chamber and arranged transverse to the direction of flow in said chamber between said inlet and outlet.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."