Nov. 18, 1924. 1,515,904

W. O. SIEVERS

VALVE MECHANISM FOR DRAINAGE SYSTEMS

Filed Aug. 7, 1923

Fig. 1.

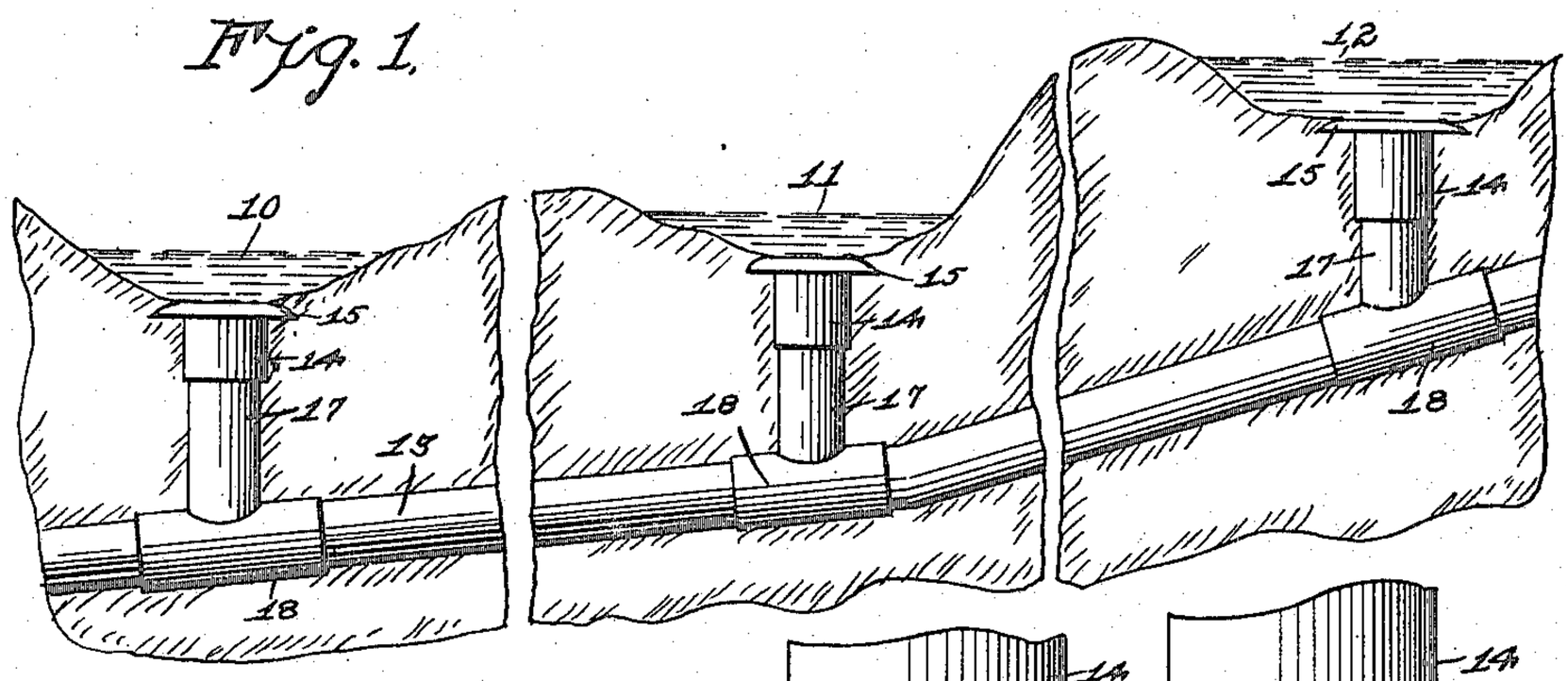



Fig. 3.

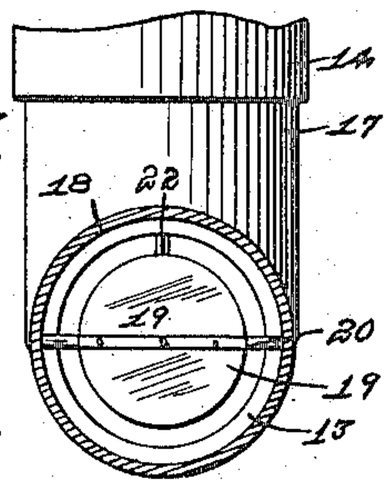
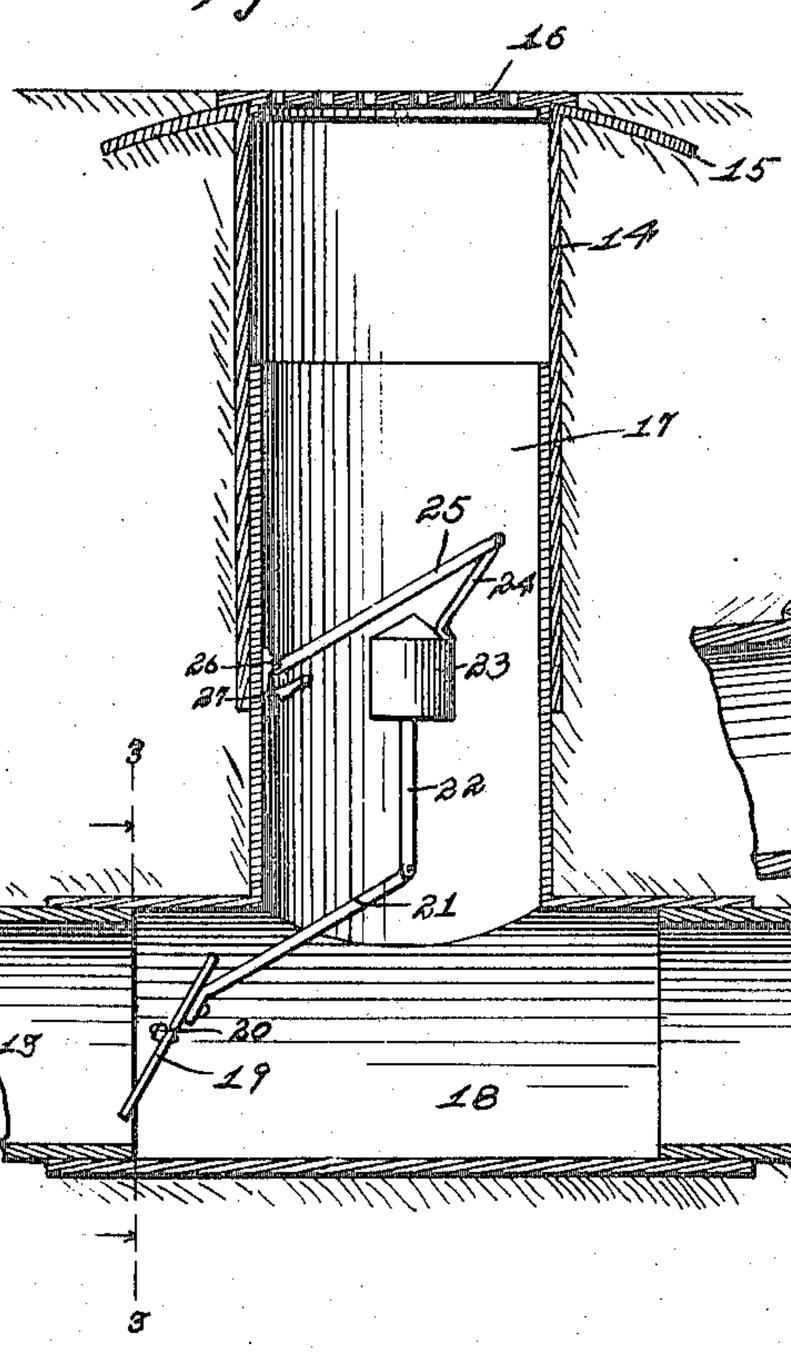



Fig. 2.



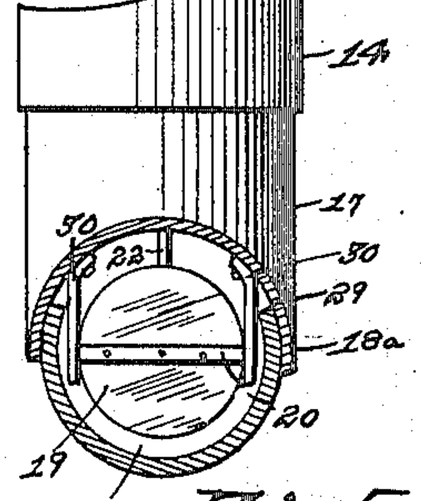




Fig. 5.

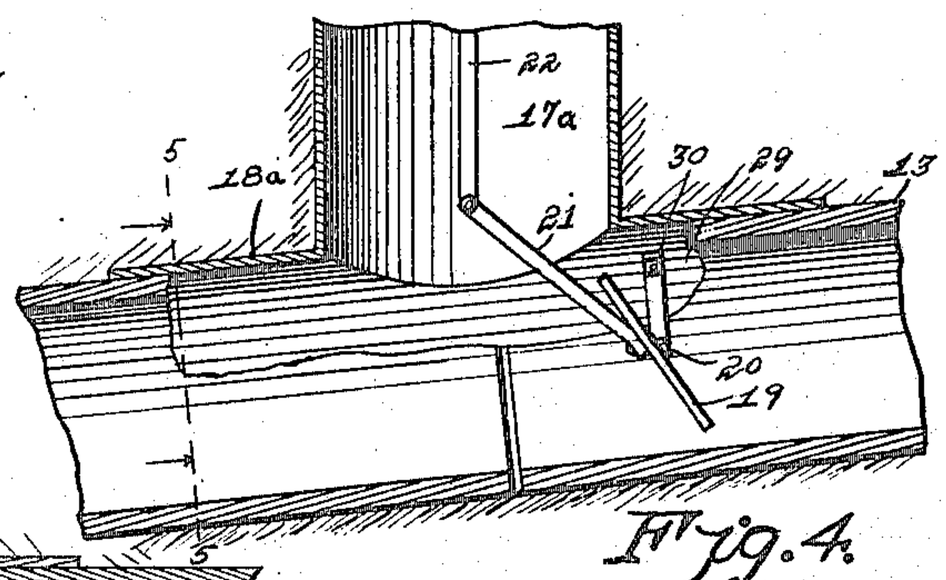



Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## VALVE MECHANISM FOR DRAINAGE SYSTEMS.

Application filed August 7, 1923. Serial No. 656,233.

*To all whom it may concern:*

Be it known that I, WILLIAM O. SIEVERS, a citizen of the United States, and a resident of Newell, in the county of Buena Vista and State of Iowa, have invented a certain new and useful Valve Mechanism for Drainage Systems, of which the following is a specification.

The object of my invention is to provide a device in the nature of a detachable valve mechanism designed to be used in connection with drainage systems, and particularly in drainage systems where there is a number of ponds drained by a single tile or conductor, the ponds being of different elevations and the device so arranged that all of the ponds may be drained simultaneously without the ponds of a higher elevation flooding those of lower elevations.

A further object is to provide in a valve mechanism for drainage systems improved means for mounting the tiles relative to the main drain tile.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a sectional view showing ponds of different elevations and the manner in which ponds are simultaneously drained by my improved device.

Figure 2 is a sectional view of my improved device showing the manner in which it is connected in a drainage system.

Figure 3 is a detail, transverse, sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a sectional view illustrating a slightly modified form of my device; and

Figure 5 is a transverse sectional view taken on the line 5—5 of Figure 4.

In the drawings I have used the reference numerals 10, 11 and 12 to indicate ponds of different elevations, all of said ponds being drained by a single line of drain tile 13, which is placed beneath the bottom of the said ponds in the usual manner. The tile is placed in any desired inclination.

The ponds 10 and 11 are connected by a section of tile of a slight grade, while the ponds 11 and 12 are connected by tile of a greater inclination. The bottom of each of the ponds 10, 11 and 12 are provided with a downwardly extending pipe 14 having a flange 15 at its upper end. Each of the flanges 15 is designed to receive a strainer plate 16. The pipe 14 is mounted vertically above the tile 13. The lower end of the pipe 14 is designed to telescopically receive the upper end of a pipe 17, the lower end of which communicates with the horizontally arranged pipe 18, the two pipes being joined together to form what is commonly known as a tee. The member 18 is joined to the main tile 13 in a telescopic manner, as clearly illustrated in Figure 2.

Mounted in the end of the member 18, which is toward the upper end of the tile 13, I have provided a valve 19 similar to what is commonly known as a butterfly valve, and which is pivoted to the sides of the member 18 in a horizontal axis by means of a pivot member 20. The valve 19 is considerably smaller in diameter than the inside diameter of the communicating tile 13, and mounted adjacent to the discharge end of the inlet tile.

The inner face of the valve 19 is provided with inwardly and upwardly extending lever 21, the free end of which is pivotally connected to an upright bar 22, the upper end of which is provided with a float 23 preferably cone shaped on its upper end. The float 23 and the upright bar 22 are located centrally within the tubular member 17.

The upper end of the float 23 is provided with an upwardly and inclined arm 24, the upper end of which is pivotally connected to one end of a link 25 of a length equal to the length of the lever 21, and mounted parallel with said lever. The free end of said link is pivoted to one side of the member 17 by means of a bracket 26 in such a manner that the float 23 is free to move up and down within the tubular member 17, and when it moves up and down it is arranged to tilt the valve 19 so that it rests in a substantially upright plane, when the float is in its elevated position, or to rest in a substantially horizontal plane when the float 23 is in its lowered position.

The downward movement of the float 23 is limited by the link 25 engaging a lug 27 formed of part of the bracket 26. The link 25 is adapted to engage the lug just at the time the valve member 19 lies in a substantially horizontal plane. Each of the ponds

is provided with a device similar to the one just described and connected in the manner shown in Figure 1.

By mounting the tubular member 17 telescopically within the member 14, I have provided means whereby the device may be easily and quickly placed in drainage systems that have already been installed.

The operation of my device is a follows:

Assuming that the device has been mounted in a drainage system such as illustrated in Figure 1 in which there is a series of ponds of several elevations, with the valve member 19 mounted adjacent to the inlet tile 13, it will be seen that water will flow from all of the ponds through its respective strainer 16 into the tubular members 14, and then into the members 14 and 17, and thence into the members 18 to the discharge tile. It will be seen that the water from the pond 12 on account of being in a higher elevation than the pond 11 will have a tendency to back up into the pond 11, due to the fact that the tile 13 below the pipe 18 of the pond 11 would be carrying water at its full capacity, and if this condition exists, water will be backed up into the member 17 of the pond 11 and cause the float 23 to be elevated. The float will then cause the valve 19 of the device mounted in the pond 11 to be moved to a closed position, thereby holding back a portion of the water from the pond 12, and permitting some of the water in the pond 11 to also enter the discharge end of the tile. The flow of water through the pipes 14 and 17 of the pond 11 has a tendency to move the float 23 downwardly due to the fact the friction therewith prevents the valve 19 from assuming an entirely closed position.

By this arrangement it will be seen that equilibrium is established between the upper and lower positions of the float 23 and water permitted to drain from the ponds 11 and 12. The same action is also established between the ponds 10 and 11, as has just been described between the ponds 11 and 12, but in no case is it possible for the float to absolutely close the valve 19 to such an extent that the flow of water from the upper pond will be entirely stopped; even if the pond 11 should become drained before the pond 12, it is impossible for the water from the pond 12 to back up into the pond 11 due to the fact that the float 23 will be elevated the moment water starts to ascend into the tile 17.

It will be seen in another case that if the pond 11 is drained before the pond 12, that the valve 19 will be permitted to be moved to its lower limit of movement, and the entire capacity of the inlet pipe may be discharged through the outlet pipe.

This device is particularly adapted to drainage systems where the main drain tile has already been laid, and in which the said tile are of uniform diameter between the intake and the discharge end of said tile.

In Figures 4 and 5 I have shown a slightly modified form of my device which is particularly adapted to that type of drainage systems where the tile has been previously laid, it being only necessary, when it is desired to install the device, to simply dig a vertical opening just above the tile and break away the upper portion of the tile leaving an opening 29 designed to be covered by a semi-tubular member $18^a$ communicating with a tubular member $17^a$ similar to the tubular member 17. The member $18^a$ is provided with a pair of downwardly extending brackets 30 designed to have mounted in their lower ends the pivot members 20. The said brackets are arranged to extend downwardly on the inside of the tile. The semi-tubular portion $18^a$ is designed to rest over the top of the tile and cover the opening 29, as clearly illustrated in Figures 4 and 5. The operation of this device is similar to the one just described.

Thus it will be seen that I have provided a device of simple, durable and inexpensive construction which may be easily and quickly applied to drain tile and when so applied will be adapted to permit a series of ponds of various elevations to be drained by a single tile simultaneously and without the upper ponds flooding the lower ones.

It will be seen that slight changes might be made in the manner in which the valve and float are mounted without departing from the spirit of my invention.

I claim as my invention:

1. In a device of the class described, an upright tubular member, a horizontally arranged tubular member communicating with the lower end of said upright tubular member, a butterfly valve arranged in the intake end of said horizontally arranged tubular member mounted on a substantially horizontally and transversely arranged axis, said valve being of smaller diameter than the intake end of said horizontal tubular member, an upwardly and inwardly extending lever for said valve, a pivoted link of substantially the same length as said lever and mounted in parallel relation therewith, one end of said link being pivoted to said upright tubular member, a float mounted centrally within said upright tubular member and slightly above its lower end, and means for pivotally mounting said float to the free end of said pivoted link and also the free end of said lever, substantially as described and for the purposes stated.

2. In a device of the class described, a series of upright tubular members, a tubular member slightly declining from the horizontal and communicating with the lower end of each of the upright tubular members, a float in each of the upright tubular mem-

bers, a series of butterfly valves situated within the approximately horizontal tubular member and so arranged that each valve is just above the communication of an upright tubular member with the approximately horizontal tubular member, said butterfly valves being of smaller diameter than the approximately horizontal tubular member, and means for operatively connecting said float and said valve in such a manner that as the float is elevated or closed, the said valve will be moved to a closed or open position.

3. In a device of the class described, an upright tubular member, a horizontally arranged semi-cylindrical tubular member with the lower end of said upright tubular member, a pair of downwardly and rearwardly extending brackets into the inlet end of said semi-cylindrical member, a float within said upright tubular member, a butterfly valve within said brackets having a less diameter than the horizontal tubular member, and means for operatively connecting said float to said valve whereby when the float is elevated or lowered, said valve will be moved to an open or closed position.

Des Moines, Iowa, May 29, 1923.

WILLIAM O. SIEVERS.