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Patented Apr. 10, 1900.

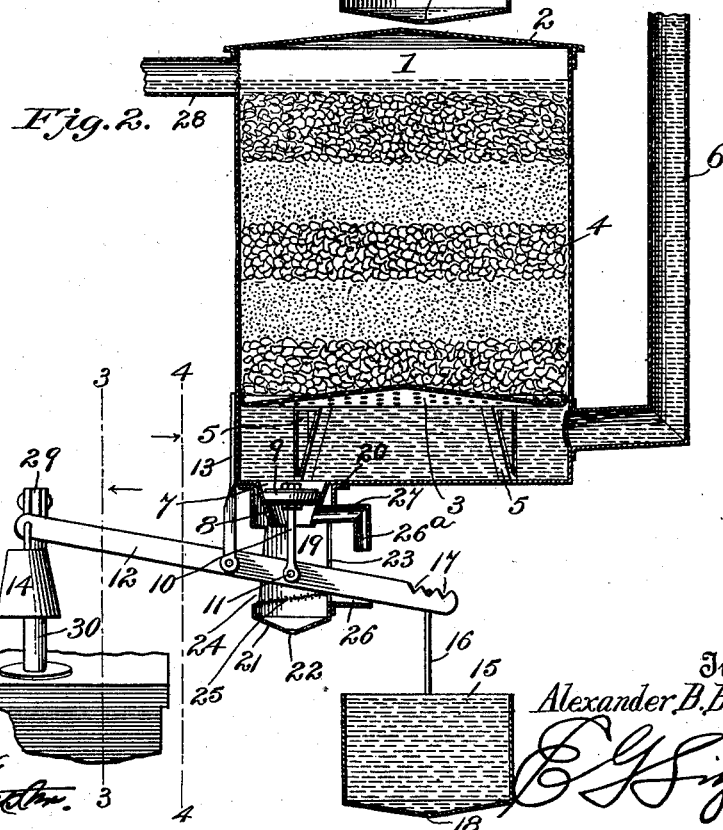
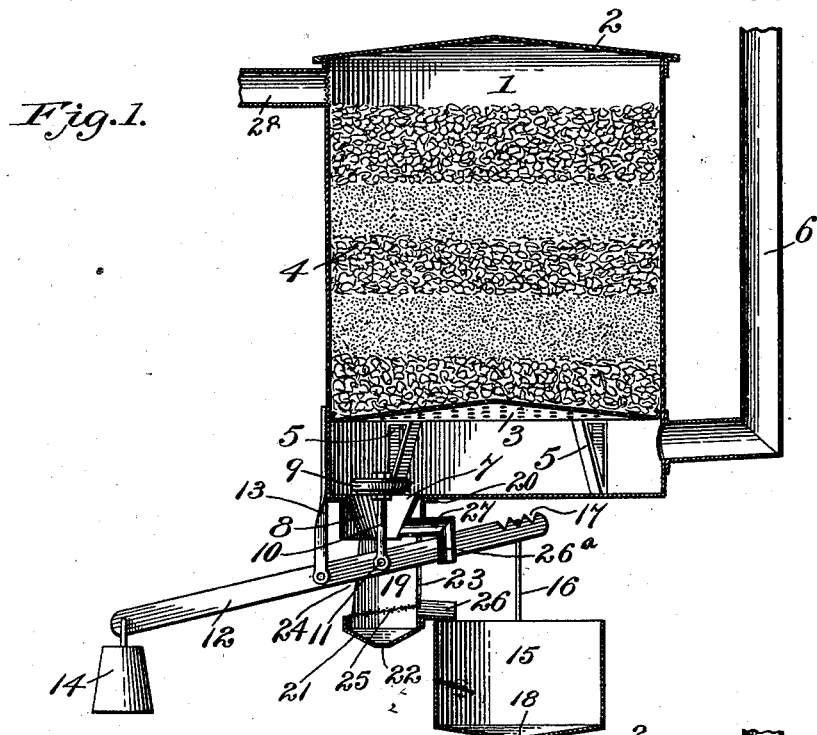
A. B. B. HARRIS.

AUTOMATIC CISTERN CUT-OFF AND FILTER.

(Application filed July 29, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses  
E. G. McKee.  
S. J. Thompson.

Inventor  
Alexander B. B. Harris.

By  
E. G. Sigg  
Attorney.

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2 Sheets—Sheet 2.

Fig. 3.

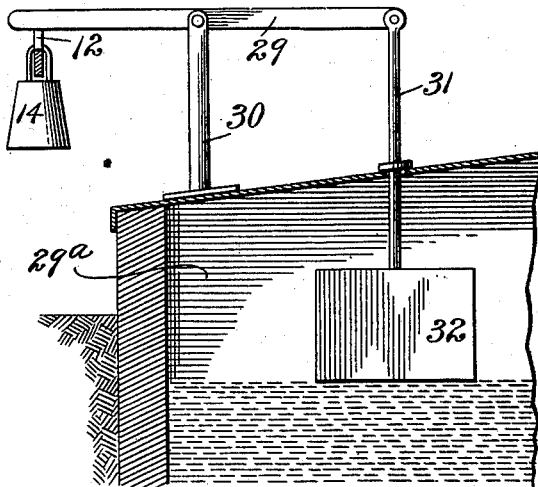


Fig. 4.

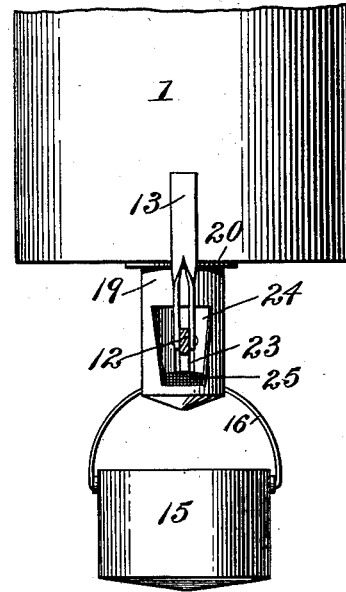
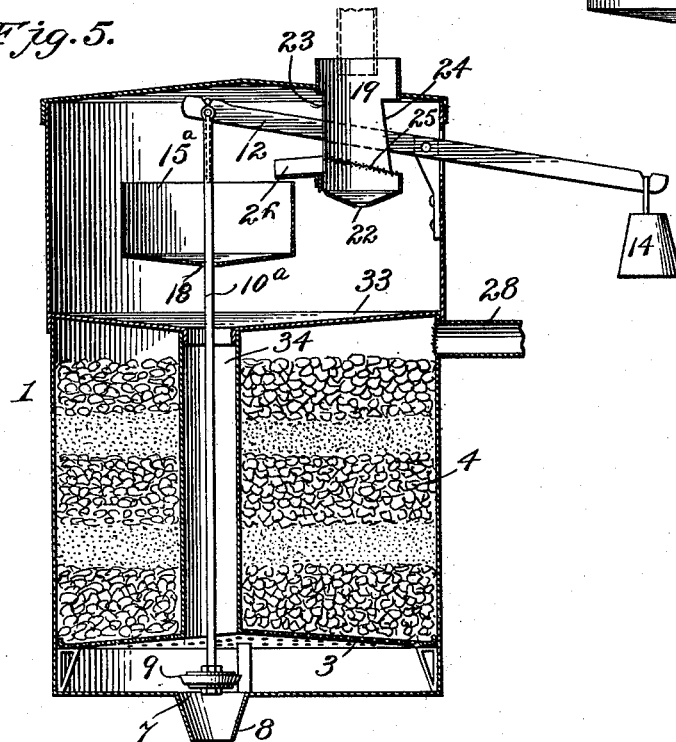


Fig. 5.



Witnesses  
E. J. McKee  
D. J. Holthaus

Inventor  
Alexander B. B. Harris  
by  
E. J. McKee  
Attorney

# UNITED STATES PATENT OFFICE.

ALEXANDER B. B. HARRIS, OF BRISTOL, TENNESSEE.

## AUTOMATIC CISTERN CUT-OFF AND FILTER.

SPECIFICATION forming part of Letters Patent No. 647,259, dated April 10, 1900.

Application filed July 29, 1899. Serial No. 725,473. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER B. B. HARRIS, a citizen of the United States, residing at Bristol, in the county of Sullivan and State of Tennessee, have invented a new and useful Automatic Cistern Cut-Off and Filter, of which the following is a specification.

This invention relates to apparatus of that character commonly known as "cistern cut-offs and filters;" and it has for one object to provide an improved automatically-operating apparatus of this character having simple and efficient means for positively draining the wash-water and trash from the roof before filtering and delivering the clear water into the cistern.

To this end the invention primarily contemplates an automatically-operating cistern cut-off and filter having the parts thereof so constructed and arranged as to provide for draining the dirty water and trash from the roof a sufficient length of time, proportionate to the amount of rainfall and size of the roof, before any water is permitted to be delivered into the cistern.

A further object of the invention is to provide means for completely draining or carrying off light rains, thereby insuring the delivery of water into the cistern only when the rainfall is sufficient to wash the roof and the water becomes clear.

Another important object of the invention is to so construct the apparatus that during the rainfall the same will automatically open up at intervals and give the filter proper an opportunity to clean itself.

In accomplishing the several objects the invention obviates the objections to that type of cistern cut-offs and filters which are arranged to operate within a given period irrespective of the amount of rainfall, so that in a short heavy rain no advantage can be taken of the same to supply the cistern, because the apparatus will not come into play sufficiently quick to secure this result, whereas in the present invention the action of the apparatus is dependent upon the amount of rainfall, thus insuring delivery of clean water into the cistern whenever there is sufficient rain for the water to wash the roof and run clear.

With these and other objects in view, which

will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

The essential features of the invention are susceptible of some modification without departing from the scope or principle thereof; but the preferred embodiment of the improvements is shown in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of an automatic cistern cut-off and filter constructed in accordance with this invention and showing the operative parts in their normal positions. Fig. 2 is a similar view with the cut-off valve closed to cause the water to pass through the filter and into the cistern and also showing the float-operated controlling device associated with the cistern to prevent overflowing of the same. Figs. 3 and 4 are detail sectional views, respectively, on the line 3-3 and 4-4 of Fig. 2. Fig. 5 is a detail sectional view showing a modification of the apparatus in which the distributing-chamber for the dirty water and trash is shown arranged at the top of the filter-tank instead of at the bottom.

Like numerals of reference designate corresponding parts in the several figures of the drawings.

Referring to the accompanying drawings, the numeral 1 designates a filter-tank of any suitable capacity and shape and inclosed at the top by a suitable lid or cover 2. The said filter-tank has arranged within the bottom thereof a removable false bottom 3, which provides a support for the strata of filtering material 4, placed within the tank, and which filter material may consist of charcoal, sand, or other substance which is usually employed for this purpose. The perforate false bottom 3 is preferably of a conical shape and is provided at its under side with a plurality of supporting-feet 5, resting upon the main bottom of the tank and serving to hold the false bottom elevated a sufficient distance above the same to provide an open chamber through which the dirty water and trash may readily flow during the period of draining off the washings of the roof before permitting the clear water to pass to the cistern.

The washings, as well as the clear water, from the roof pass through the inlet-pipe 6 into the filter-tank, said inlet-pipe connecting with the usual spout and guttering of the roof in the ordinary way and connecting with the filter-tank at or near the bottom thereof, below the plane of the perforate false bottom 3 therein, so that all the washings and water from the roof enter the filter-tank below the perforate false bottom which supports the filtering material. To provide for the discharge of the dirty wash-water and trash which come from the roof through the inlet-pipe 6 the filter-tank 1 is provided in the main bottom thereof with a bottom discharge-opening 7 and a conical neck 8, fitted in and extending below the plane of said opening to provide for carrying off the dirty water and trash, and the outlet-port through the said neck 8 is proportioned to the size of the roof, so it has sufficient capacity to carry off any amount of water that will wash the roof.

The passage of the dirty water and trash through the discharge-opening 7 and the neck 8, leading therefrom, is controlled by a cut-off valve 9. This valve is preferably of the disk type and snugly works within the conical neck 8, which forms a seat therefor. The said valve 9 is fitted to the upper end of a valve-stem 10, extending through and below the neck 8 and pivotally connected at its lower end, as at 11, to an oscillatory valve-lever 12. The valve-lever 12 is pivotally suspended intermediate its ends from a hanger arm or strap 13, fastened to the tank at one side thereof and depending below the same to provide for holding the valve in an operative position below the plane of the main bottom of the tank. The said valve-lever 12 is designed to support upon one end thereof an overbalance-weight 14, while the opposite end of the lever has connected therewith a water-bucket 15, whose bail 16 is adapted to be adjustably engaged in the notches 17, formed in the upper edge of the valve-lever. This adjustable connection of the water-bucket with the valve-lever provides for the proper relative adjustment of said water-bucket and the overbalance-weight 14, according to the rapidity with which it is desired for the valve to be controlled by the bucket when filled with water, and at this point it will be observed that the water-bucket 15 is provided in the bottom thereof with a vent-opening 18, which provides for draining said bucket of its water during, as well as at the termination of, the rain, as will be hereinafter more fully explained. The dirty water and trash, which pass through the discharge-opening 7 and the neck 8, extended therefrom, run into the distributing-chamber 19. This distributing-chamber for the dirty water and trash is detachably or otherwise suitably fastened at its upper end, as at 20, to the under side of the tank and is arranged to extend below and within the vertical plane of the said discharge-opening 7. The distributing-chamber 19 is

of a sufficient size to provide for properly carrying off the dirty water and trash and is provided with a dished bottom 21, having a central drain-opening 22 therein, which drain-opening corresponds to the outlet-port in the discharge-neck 8, as it is proportioned to the size of the roof, so as to be of sufficient capacity to carry off the amount of water necessary to wash the roof. In this connection it will of course be understood that a light rain which is not sufficient to wash the roof will all be carried off through the drain-opening 22 without affecting the apparatus or passing through the filtering material thereof.

Above the plane of its dished bottom 21 the distributing-chamber 19 is provided in diametrically-opposite sides with the overflow and waste openings 23 and 24, respectively, the overflow-opening 23 being conveniently extended in the form of a slot to provide a guideway for the portion of the valve-lever 12 carrying the water-bucket. The opposite waste-opening 24 is of a sufficient size to not only assist in disposing of the surplus water which backs up from the dished bottom 21, but also to form the outlet for trash and other sediment. The discharge of the trash and sediment through the waste-opening 24 is facilitated by an inclined screen diaphragm 25, fitted within the lower portion of the distributing-chamber 19 and serving to prevent the passing of the trash and sediment into the drain-opening 22 and also into the outlet-spout 26, leading from one side of the distributing-chamber and communicating at its inner end with the overflow-opening 23. The said spout 26 extends at an inclination from the distributing-chamber 19 and overhangs the water-bucket 15, which bucket is also overhung by the pendent leg of the overflow-elbow 26'. The upper arm 27 of the elbow is disposed at an inclination and is connected with the discharge-neck 8 to receive water therefrom for the purpose of accelerating the filling of the bucket while the filter is cleansing and during the continuance of the rainfall, as will be presently explained.

In the normal position of parts the weight 14 overbalances the empty bucket 15 and holds the cut-off valve 9 off its seat, thereby uncovering the opening 7 and the passage through the neck 8. With the parts thus positioned the initial portion of the water—that is, the dirty wash-water and trash coming from the roof—will pass beneath the false bottom 3 and into the distributing-chamber 19. The drain-opening 22 will carry off any amount of water that is insufficient to wash the roof; but an excess of this amount cannot find vent through said opening 22 and backs up into the distributing-chamber 19, so as to overflow through the overflow and waste openings 23 and 24, respectively. These openings are proportioned to the length of time the roof is permitted to wash, and to vary the area of the waste-opening 24 to graduate the discharge according to the amount of rainfall

the said opening 24 is preferably constructed of a flaring shape, as shown in detail, Fig. 3 of the drawings. Being proportioned to the time the roof is permitted to wash, the overflow and waste openings 23 and 24 will continue to carry off the surplus wash-water a sufficient length of time before the water from the roof is caused to pass directly through the filtering material. To secure the operation of the apparatus when the flow of water is of sufficient volume, the water from the overflow-opening 23 passes through the outlet-spout 25 and into the bucket 15. When this bucket becomes filled with water, it overbalances the weight 14 and closes the valve 9, thereby causing the clean water to pass up through the filtering material 4 and thence through the delivery-pipe 28 into the cistern 29<sup>a</sup>, of the ordinary type.

After the parts have assumed the position described the water in the bucket 15 commences to drain therefrom through the vent-opening 18 until the weight 14 again overbalances said bucket and opens the cut-off valve 9. This permits the large volume of water now in the filter-tank to rush out of the bottom discharge-opening, thereby cleansing the filter. This outrush of water from the filter not only backs up through the outlet-spout 25, but also through the overflow-elbow 26<sup>a</sup>, and consequently the water-bucket 15 will be rapidly filled again, so as to close the valve. This operation repeats itself continuously during the rainfall, and consequently maintains the filter in a thoroughly-clean condition and insures the delivery of clean water into the cistern.

In the event of the cistern becoming entirely filled during the action of the apparatus the further flow of water into the same is cut off by a float-actuated controlling device. This controlling device essentially consists of a trip-lever 29, pivotally supported on a stem 30, arising from the top of the cistern and having connected to one end thereof a stem 31 of a float 32, working within the cistern, upon the water therein. The opposite end of the trip-lever 29 is disposed over the weight-carrying end of the valve-lever 12 and descends upon said lever, so as to open the cut-off valve when the level of the water in the cistern rises to its maximum height.

A modification of the invention is shown in Fig. 5 of the drawings, in which the main operating parts are arranged at the top of the filtering-tank instead of at the bottom. In this modification the distributing-chamber 19 is of precisely the same construction as the distributing-chamber already described, but is fitted to the top of the filter-tank so that the outlet-spout 25 will overhang the water-bucket 15<sup>a</sup>, arranged to work within the top portion of the filter-tank and receiving there-through the valve-stem 10<sup>a</sup>, to the lower end of which is fitted the cut-off valve 9, working within the discharge-neck 8 at the bottom of the filter-tank. The modified arrangement

of parts also involves the positioning of the valve-lever 12 at the top of the filter-tank and the covering of the filtering material with an imperforate top plate 33, which prevents the dirty water and trash from entering the filtering material as it is delivered from the distributing-chamber 19 in the manner already described. The imperforate top plate 33, which forms a cover for the filtering material 4, is fitted into the upper end of a conducting-pipe 34, passing through the filtering material and opening at its lower end into the chamber below the false bottom 3. When the valve 9 is open, the dirty water and trash from the distributing-chamber 19 pass off of the imperforate top plate 33 into the conducting-pipe 34 and thence through the bottom discharge-opening 7. When the water-bucket 15 fills from the outlet-spout 26 in the manner already described, the valve 9 closes, and the water which is then delivered into the top of the filtering-tank through the distributing-chamber backs up through the filtering material 4 and finds escape through the delivery-pipe 28 into the cistern.

With the modified arrangement of parts described it will of course be understood that the distributing-chamber 19 receives the water directly from the spouting of the building, as indicated by dotted lines in Fig. 5.

If desired, the apparatus may be operated solely as a cistern cut-off without using filtering material to filter the water. This would not require any change in the construction except the omission of the filtering strata.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described automatic cistern cut-off filter will be apparent to those skilled in the art without further description; and it will be understood that changes in the size, shape, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described the invention, what is claimed is—

1. In an apparatus of the class described, the combination of a tank having a bottom discharge-opening, a cut-off valve arranged to cover and uncover said opening, a weighted valve-lever operatively connected with the valve to normally hold the same open, a water-bucket suspended from the valve-lever, and a distributing-chamber having a bottom drain-opening, and an overflow-opening discharging into said bucket, substantially as set forth.

2. In an apparatus of the class described, the tank having a bottom discharge-opening, a cut-off valve for said opening, a weighted valve-lever for holding said valve normally open, a water-bucket suspended from the valve-lever and normally overbalanced, and a distributing-chamber associated with the tank and provided with a bottom drain-opening, and lateral overflow and waste openings,

one of which discharges into the water-bucket, substantially as set forth.

3. In an apparatus of the class described, a tank provided with a bottom discharge-opening, a cut-off valve for said opening, a weighted valve-lever for normally holding the valve open, a water-bucket suspended from the valve-lever normally overbalanced, and a distributing-chamber associated with the tank, and provided with a bottom drain-opening, oppositely-located overflow and waste openings, and an outlet-spout leading from the overflow-opening and overhanging the water-bucket, substantially as set forth.

4. In a cistern cut-off and filter, a filter-tank provided with a bottom discharge-opening, a cut-off valve for said opening, a weighted valve-lever connected with the valve-stem, a water-bucket suspended from the valve-lever and normally overbalanced, and a distributing-chamber associated with the filter-tank, and provided with a dished bottom having a central drain-opening, a pair of overflow and waste openings, the latter of which is flared upwardly, and the former of which discharges into the water-bucket, and a screen-diaphragm arranged within the bottom portion of said chamber, substantially as set forth.

5. In an automatic cistern cut-off and filter, a filter-tank having a bottom discharge-opening, a cut-off valve for said opening, a weighted valve-lever connected with the valve-stem, a water-bucket suspended from the valve-lever, and normally overbalanced, and a distributing-chamber arranged in communication with said bottom discharge-opening and provided with a bottom drain-opening, and also with an overflow discharging into said bucket, substantially as set forth.

6. In an apparatus of the class described, the combination of a tank having a discharge-opening, a normally-open valve for covering and uncovering said opening, means for carrying off a light volume of water, including the initial dirty wash-water, without affecting the position of the valve, and separate means for automatically causing the inter-

mittent opening and closing of the valve during the continuance of the flow of water into the tank, and after said other means has ceased to be operative, substantially as set forth.

7. In an automatic cistern cut-off and filter, the filter-tank having a discharge-opening for dirty water and trash, a cut-off valve for the opening, a weighted lever connected with the valve-stem, a water-bucket suspended from the valve-lever and normally overbalanced, and means for automatically causing the intermittent filling and emptying of said bucket during the continuance of the flow of water into the filter-tank, substantially as set forth.

8. In an automatic cistern cut-off filter, the filter-tank provided with a bottom discharge-opening having a neck extended therefrom, a weighted lever carrying a valve arranged to cover and uncover said opening, a water-bucket suspended from the lever and normally overbalanced, said bucket having a bottom vent-opening, a distributing-chamber arranged beneath said discharge-opening, and having a bottom drain-opening and an overflow discharging into said bucket, and an overflow connection with the discharge connection of the filter, said connection overhanging the water-bucket, substantially as set forth.

9. In an apparatus of the class described, the combination with the filter-tank and the valve mechanism including an oscillatory lever carrying a weight at one end and a water-receiving bucket at the other, of a controlling device comprising a trip-lever carrying a float working within the cistern and having one end thereof arranged over and operating upon the end of the oscillatory valve-lever carrying the weight, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

A. B. B. HARRIS.

Witnesses:

JOHN H. SIGGERS,  
BERTRAM G. FOSTER.