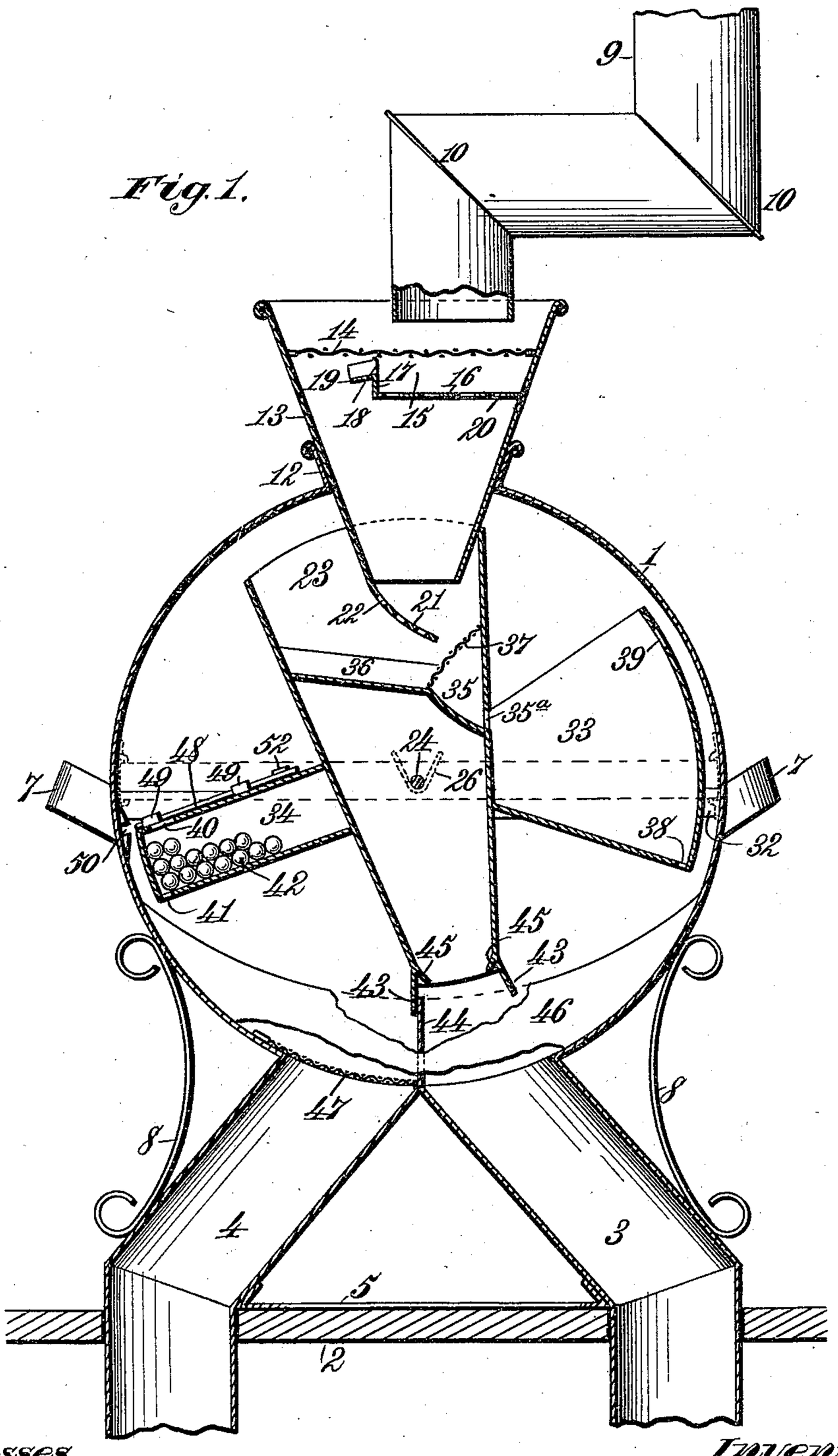
(No Model.) 3 Sheets—Sheet 1.

W. W. BAYS.

AUTOMATIC RAIN WATER CUT-OFF AND FILTER.

No. 513,000. Patented Jan. 16, 1894.

Fig. 1.



Witnesses.
Robt Ewett.
D. W. Rea

Inventor.
William W. Bays.
By James L. Norris.
Atty

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

W. W. BAYS.

AUTOMATIC RAIN WATER CUT-OFF AND FILTER.

No. 513,000. Patented Jan. 16, 1894.

Fig. 3.

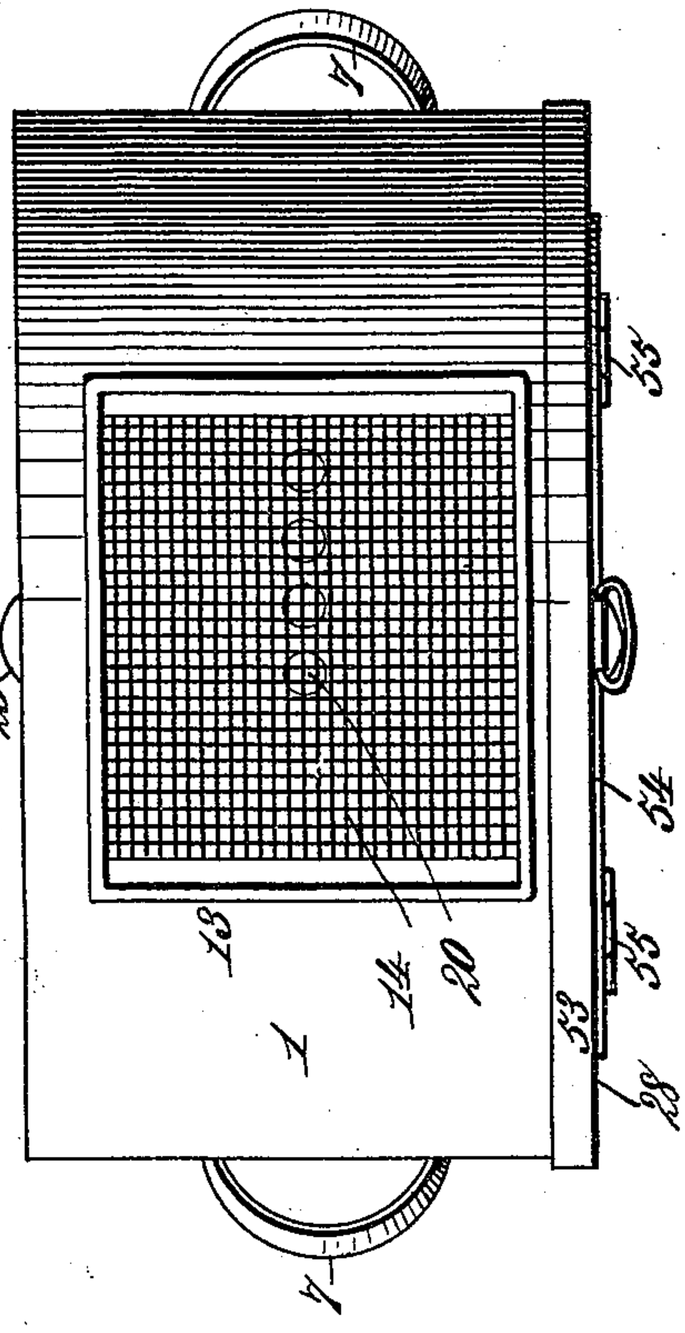


Fig. 4.

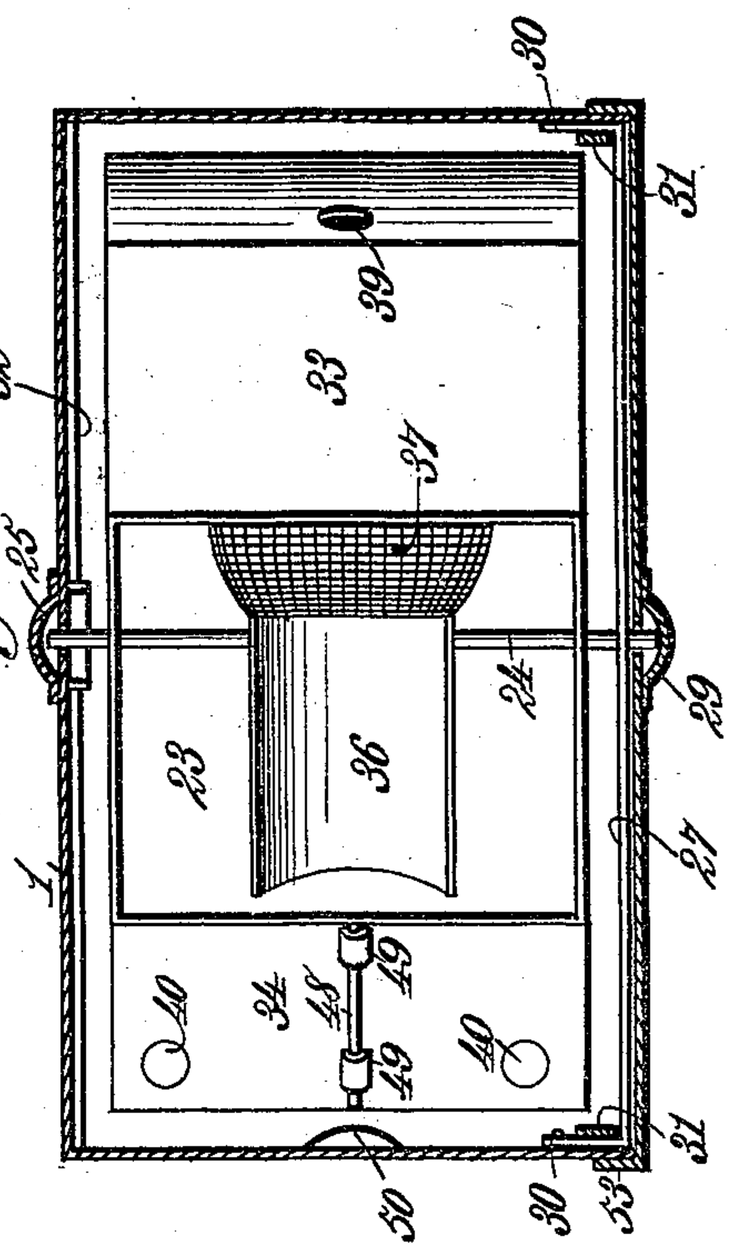
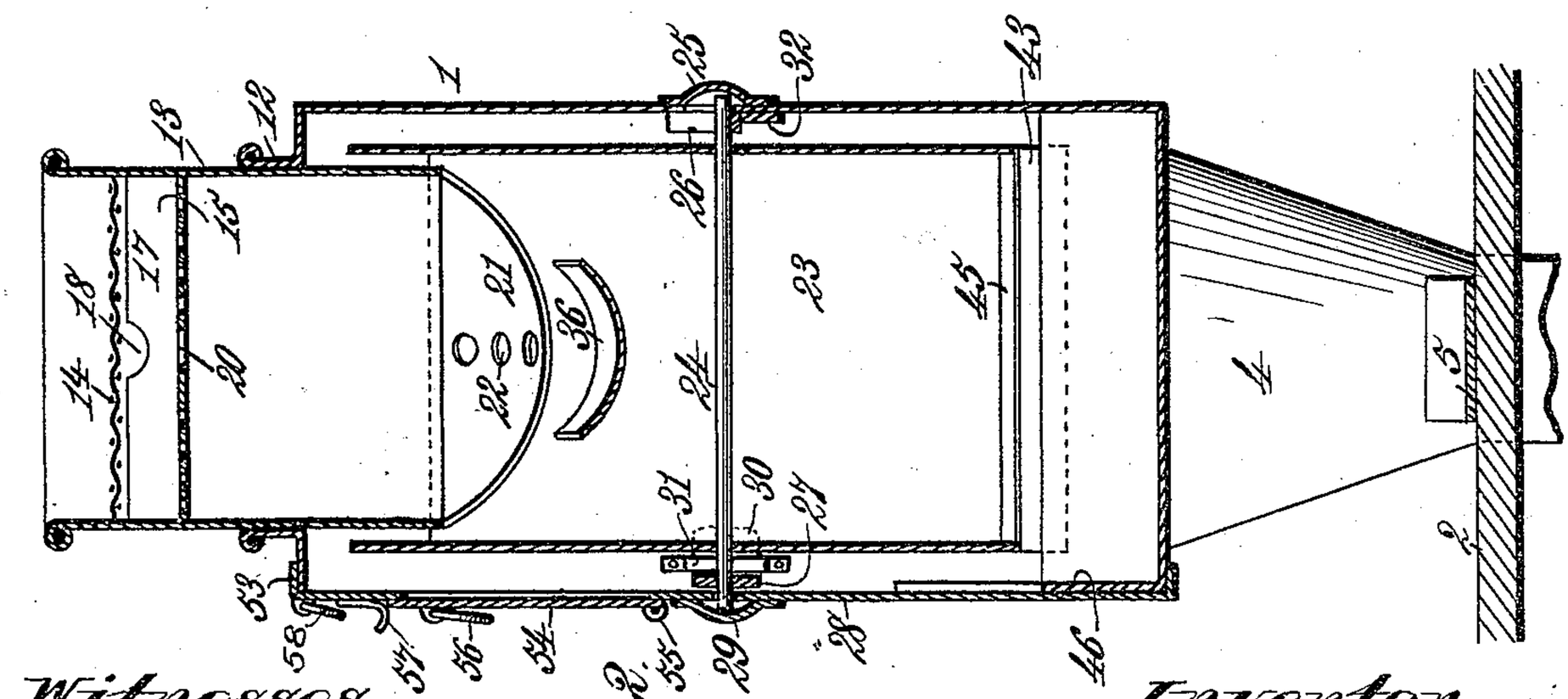


Fig. 2.



Witnesses.
Robert Ewett.
G. W. Rea.

Inventor.
William W. Bays.
By James L. Norris.
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 3.

W. W. BAYS.

AUTOMATIC RAIN WATER CUT-OFF AND FILTER.

No. 513,000 Patented Jan. 16, 1894.

Fig. 5.

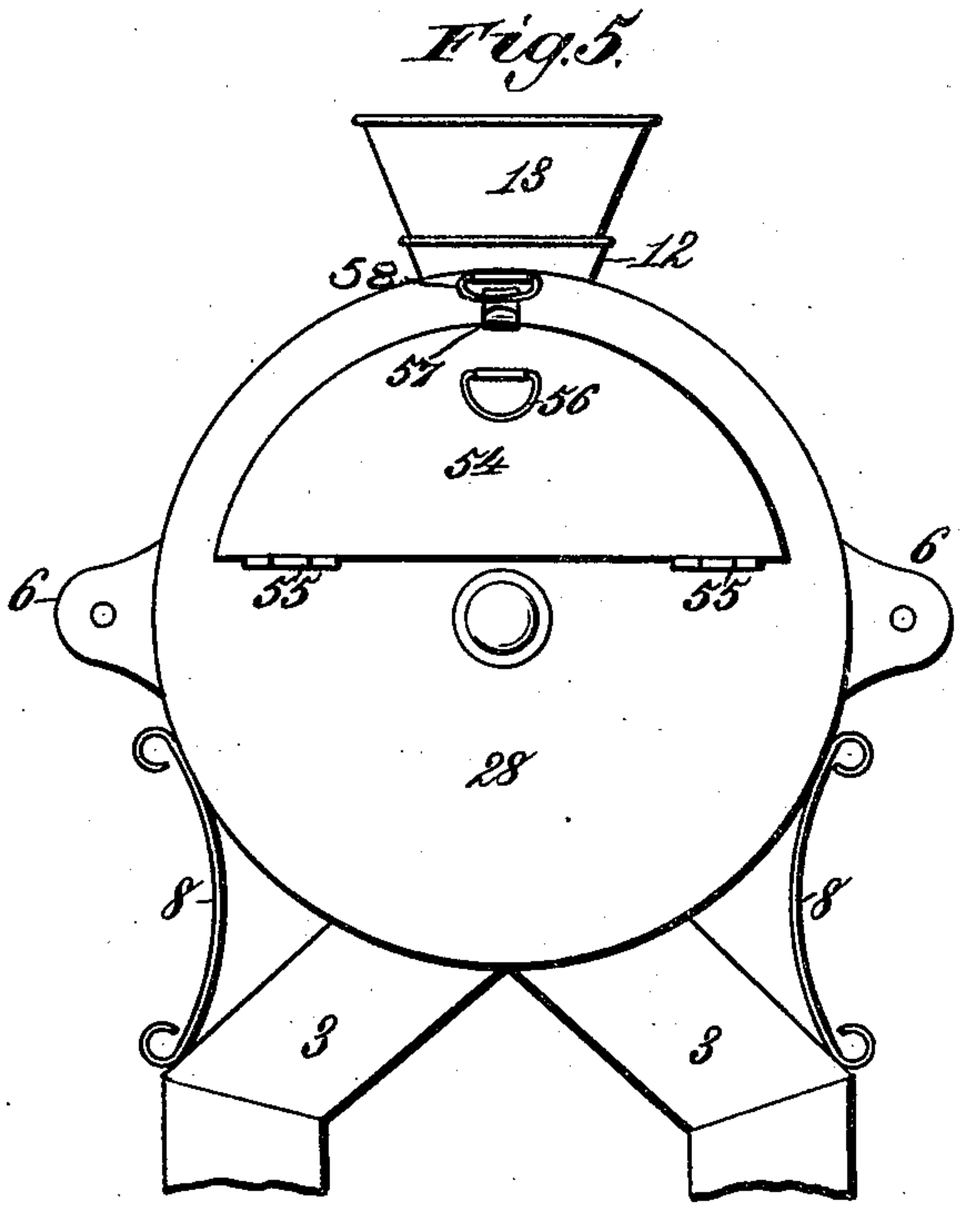


Fig. 6.

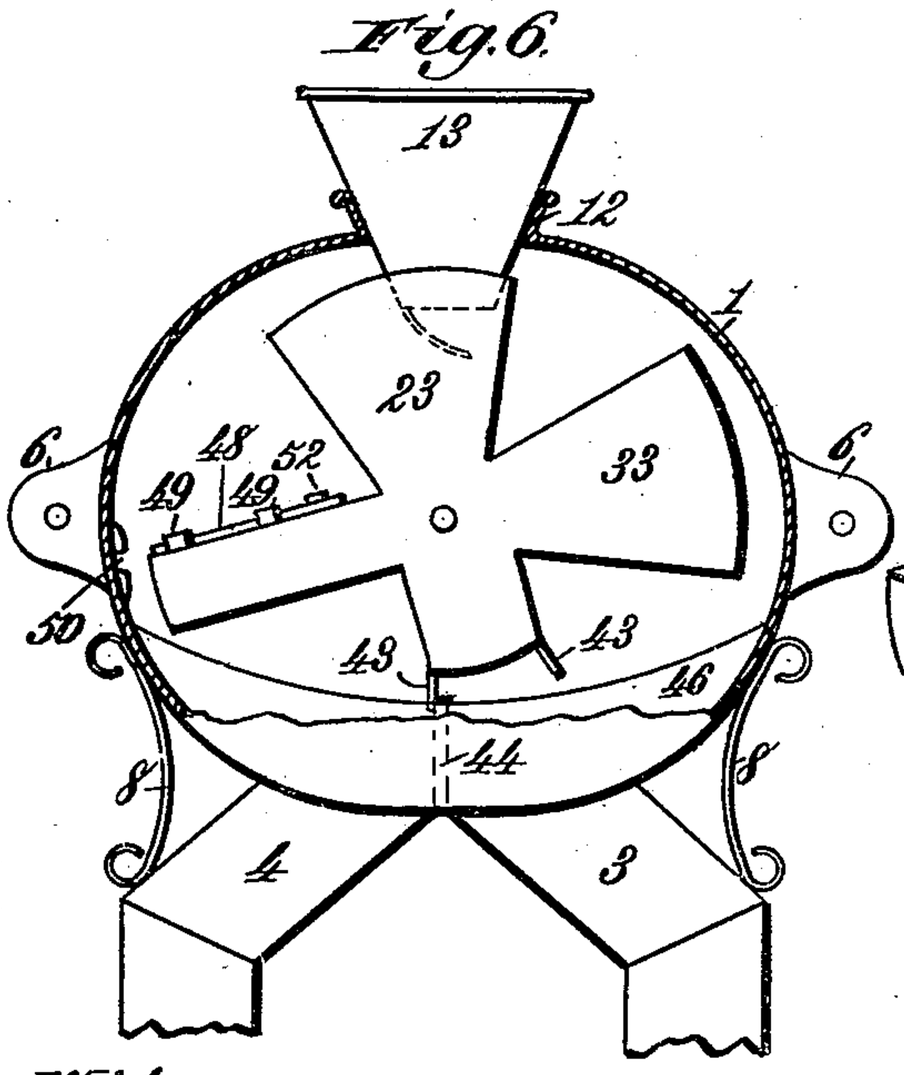
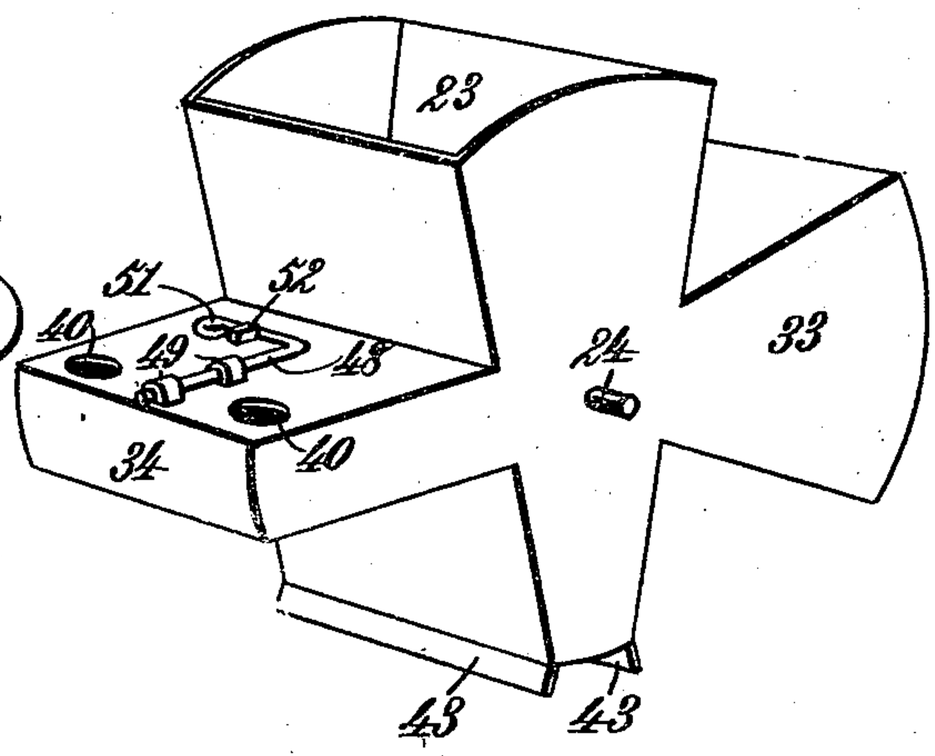


Fig. 7.



Witnesses.
Robert Ewett.
G. H. Rea.

Inventor.
William W. Bays.
By James L. Norris.
Atty.

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM W. BAYS, OF ROME, GEORGIA.

AUTOMATIC RAIN-WATER CUT-OFF AND FILTER.

SPECIFICATION forming part of Letters Patent No. 513,000, dated January 16, 1894.

Application filed July 24, 1893. Serial No. 481,292. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. BAYS, a citizen of the United States, residing at Rome, in the county of Floyd and State of Georgia, have invented new and useful Improvements in Automatic Rain-Water Cut-Offs and Filters, of which the following is a specification.

This invention relates to an improved automatically actuated apparatus for conducting the first flow of soiled and impure rain-water, from a roof or other water-shed, to a waste pipe or conduit, and subsequently causing the succeeding flow of clean water to be directed, by automatic action, to a cistern or other receiving reservoir.

The objects of my invention are to provide a combined rain-water cut-off and filter which will be neat, simple and comparatively inexpensive, and in which the several parts of the apparatus shall be so constructed and arranged as to be efficient and reliable, and free from any liability of becoming disarranged or getting out of repair.

To these ends my invention consists in the features of construction and novel combinations of devices, in a rain-water cut-off and filter, as hereinafter more fully set forth, and particularly pointed out in the claims.

In the annexed drawings illustrating the invention,—Figure 1 is a front elevation of a combined rain-water cut-off and filter, embodying my improvements, the front vertical wall or lid of the vessel or deflector casing being removed, and also a portion of a dam or splasher immediately inside the lower front portion of the casing fitting against the inside of the lid, and showing the deflecting devices in normal position. Fig. 2 is a transverse vertical section of the same, and also showing the funnel-shaped outlets 3 and 4. Fig. 3 is a plan of the apparatus, and showing the lateral series of large holes in the break-water. Fig. 4 is a horizontal section of the apparatus. Fig. 5 is a front elevation with the lid or front cover in place. Fig. 6 is a vertical longitudinal section illustrating a modification in the form of the casing and deflector spout. Fig. 7 is a perspective of the automatically oscillatory deflecting mechanism.

Referring to the drawings, the numeral 1 designates the casing or inclosing vessel of the deflecting mechanism and filtering devices. This casing may be made of any suitable material, such, for instance, as tin-ware, sheet-iron, zinc, galvanized iron, cast metal or wood. Though the casing may have any appropriate form, I prefer a curved or circular shape, because the casing will thereby the better drain or empty itself of all water and thus prevent injury from settlings, rusting and freezing. Moreover, by adopting a circular form, as shown in Figs. 1 and 5, or an elliptical form, as shown in Fig. 6, the casing can be more easily and cheaply manufactured and will present a more neat and tasteful appearance.

The casing 1 may be supported in any convenient manner, preferably upon a bench, table, or shelf 2 which may have openings for passage of the outlet pipes 3 and 4. If supported in this manner the casing 1, may be secured to the bench, table or shelf by means of nails or screws or other fastenings passed through or engaged with a horizontal stay or brace 5, attached to and extended between the outlet pipes 3 and 4, as shown in Fig. 1. Or as shown in Figs. 5 and 6, the casing 1 may be attached to the side of a house or other support by means of lugs or flanges 6, located on the rear side edges of the casing and perforated for passage of tacks or nails. If desired, the casing may be provided with handles 7, as shown in Fig. 1. Curved braces, 8, may be secured to the lower portions of the curved casing rim and contiguous portions of the outlet pipes 3 and 4, to strengthen these parts and give a finished appearance to the apparatus, as shown in Figs. 1, 5, and 6.

Above the casing of the rain-water cut-off and connected with the down spout or conduit from the roof or other water-shed, is a receiving spout 9, preferably provided with two or more elbows 10, to break the force of the falling water.

In the top of the casing 1, is an opening surrounded by an outwardly flared flange 12 that receives and supports a removable hopper 13, which is extended downward within the casing. When the apparatus is in position, this hopper 13 is beneath the rain spout 9, leading from the gutters on a roof or other water-shed. The upper part of the hopper 13 is provided with a fixed or removable fil-

tering screen 14, Figs. 1 and 3, which may be made of rather coarse wire cloth or other suitable material adapted to prevent leaves, bugs, sticks, chips or any coarse, solid matter from entering the hopper.

Beneath the filter 14, and supported in one side of the hopper 13 is a breakwater 15, which consists of a tank or receptacle having a foraminous bottom 16, and provided at one side with a vertical wall or flange 17, having in the center of its upper edge a notch 18, to which a short spout 19 is fitted. In the perforated tank bottom 16 is a centrally lateral series of larger perforations 20 for a purpose to be presently explained.

The lower end of the hopper 13 descends some distance inside the casing or vessel 1 and terminates on one side with a laterally and longitudinally curved deflector 21, preferably rounded at the end as shown in Fig. 2, and somewhat bent and made trough like or spout like. This curved and trough like deflector 21 is provided in its longitudinal center with a series of perforations 22 as shown in Figs. 1 and 2. The hopper 13 can be easily removed in order to give access to its interior, for cleaning any of the attached parts, or for other purposes.

In the center of the casing 1 is pivotally supported a hollow approximately cross-shaped deflecting device comprising a vertical, or nearly vertical, hollow arm or spout 23, that is adapted to be rocked or oscillated automatically toward either side of the casing for the purpose of directing the first flow of soiled water into the waste pipe 3 and the subsequent flow of clean water into the outlet pipe 4 leading to a cistern or other reservoir. The hollow oscillatory arm or spout 23 is open at both ends, as shown in Fig. 1, and is supported at or about its center on a transverse horizontal shaft or axle 24, to which said spout is firmly fastened. The rear end of the axle 24 may be journaled in the rear vertical wall of the casing through which it is passed at or about the center of said wall (Figs. 1 and 4). On the outside of the casing is fastened a disk or button 25 against which the rear end of the axle 24 abuts. The rear portion of the axle 24 may also rest in a somewhat V-shaped bearing 26 fastened to the inside of the casing and serving also, as a guide for assisting in more conveniently placing the rear end of the axle 24, in proper position. The front end of the axle, 24, is supported by a horizontal bar 27, that is removably supported across the central portion of the front of the casing immediately inside a removable front or lid 28, Figs. 2 and 5, by removal of which access may be had to the interior of the casing. (See Figs. 1 and 3.) The bar 27 is provided with a hole in the middle through which is passed the front end of the axle 24 which may also be passed through a hole in the lid 28, and abut against a disk or button 29 fastened to the outside thereof, (as seen in Figs. 2 and 5.) The two ends of the bar 27 are bent inward, at right angles, to form attaching lugs 30, Figs. 2 and 4, that are removably supported in cleats 31 attached to the inside of the casing rim. The removable bar 27 should be sufficiently strong and rigid, especially at its middle, to support the axle 24 without sagging or swaying. If desired, the rear side or wall of the casing may be reinforced by a horizontal bar 32, Fig. 2, placed just below the center, but this will be seldom necessary. The lid may be similarly strengthened also, if desired.

The hollow pivotally mounted arm or spout 23 is provided on one side with a hollow, preferably open-top arm or "cup" 33, and on the other side with a hollow arm or box 34, which arms 23, 33 and 34 constitute a somewhat cruciform oscillatory deflecting device, operating simultaneously in all its parts. The vertical open ended arm or spout 23 has a tapering form and is much smaller at its lower end than at the top which loosely surrounds the lower end of the hopper 13, as shown in Fig. 1. It may be made to slope uniformly from top to bottom, as shown in Fig. 1, or it may be flared or funnel shaped from the top down to the arms 33 and 34 and be thence continued downward with parallel sides as shown in Fig. 6.

Within the hollow oscillatory arm or spout 23 is a trough 35 attached to the inner side of said spout adjacent to the cup 33 with which said trough communicates through an opening 35^a near the top of the inner end of said cup. The trough 35 receives water from the lower end of the deflector 21 and also from a slightly inclined trough 36 which is arranged centrally across the upper portion of the oscillatory spout 23 below and in line with the perforations 22 in the center of said deflector. One end of the trough 36 rests on the trough 35 and empties therein and the other end abuts against the opposite inner wall of the spout 23 as shown in Fig. 1. This trough 36 is for the purpose of insuring a sufficient flow of water to the trough 35 and cup 33 even when the quantity of rain water coming into the hopper 13 and spout 23 is inconsiderable and when possibly, the water falling from the deflector 21 might not reach the trough 35, after the distance between them has been considerably increased, by the movement of the deflecting device from its normal position. The trough or channel 36, passing quite across the cavity of the vertical hollow arm or spout 23, cannot fail to receive a sufficient quantity of water from the point of the deflector 21 and from its series of holes 22 to keep the cup 33 filled during the rain fall. The trough 36 is so inclined as to always lead the water received by it into the trough 35, and its location and inclination are such that it will never conflict with the deflector 21, below which it is placed. The trough 35 has its top covered with a strainer or filter 37 made of perforated metal, wire cloth or other suitable material and sufficiently inclined to drain itself

and allow all solid particles to be dislodged from it and thereby prevent rusting and clogging. The purpose of this strainer or filter is to prevent any solid matter from entering the trough 35, and cup 33, communicating therewith. The opening, 35ª, should be located at the very bottom of the trough 35 which is preferably of such curvature that all the water received by it will escape thus avoiding liability of rusting or freezing.

The bottom of the hollow transverse arm or cup 33 is so inclined toward its outer end, where it is provided with a small outlet 38, that the water in it will always flow that way and escape through said outlet, even when the oscillatory deflecting device is in the normal position represented in Fig. 1, thus insuring perfect drainage of the cup after the rainfall has ceased. In the upper part of the cup 33, preferably at its outer end, there is another and somewhat larger outlet 39 which allows water to escape from the cup after it is sufficiently filled and prevents overflowing at the top edges of the cup.

The hollow arm or box 34 may consist of one or more longitudinal compartments, closed on all sides except where provided on top with holes 40, and in the bottom with small holes 41, Fig. 1 or it may be cylindrical in form, if desired. The upper holes or openings 40 permit insertion of the rolling balls or weights 42 and the small holes 41 are intended for escape of any water that might accidentally enter the ball compartment, 34. The balls 42 give sufficient weight to the arm, 34, to normally throw the oscillatory spout 23 into such position as to communicate with the waste pipe 3 and conduct therethrough the first flow of soiled water from the roof. The hollow arm or cup 33 is designed for the temporary retention of a sufficient quantity of water, gradually accumulated therein during a rainfall to overcome the weight of the opposite arm 34 and contained balls 42 and at the proper time, automatically shift the discharge end of the spout 23 from its normal position and cause the remaining flow of water, now clean, to pass into the outlet pipe 4, and thence to a cistern.

The time occupied in sufficiently filling the cup 33 to make it overbalance the arm 34 and balls 42, and thus reverse the normal position of the oscillatory deflecting device, 23, 33, 34, will depend upon the relative areas of the openings or passages 35ª, and 38, and also upon the weight of the arm 34 and its contained balls. Several minutes should elapse after the rain fall begins, before the deflecting device becomes automatically reversed, so as to allow sufficient time for the roof or other water-shed to be thoroughly washed off and cleansed before the water is permitted to pass to the cistern. The opening 38 is, of course, smaller than the opening 35ª.

The lower end of the oscillatory spout, 23 is provided on two opposite sides with outwardly flared flanges, 43 that are adapted to bear alternately against the opposite sides of a transverse vertical partition or bridge-wall 44 that is extended across the lower part of the casing 1 in such manner as to divide the said lower part of the casing into two compartments, one of which communicates with the waste pipe 3 that may lead to a sewer or drain, while the other communicates with the outlet pipe, 4, which should discharge into a cistern or other reservoir for clean water. In the lower part of the spout 23 are also two opposite inwardly inclined lips 45 which are so arranged as to cause the descending water to fall clear of either side of the bridge wall 44 while the flanges 43 serve alternately to prevent any reflex flow or regurgitation of water, discharged from the spout 23 and also act as stays, to hold the cruciform deflecting device steadily in its alternate positions.

The bridge wall or partition 44 is fastened water-tight to the bottom and rear wall of the casing 1, and is secured, water tight, at its front end to the inner side of a dam or splasher 46 which is firmly attached across the lower front part of the casing. The junction of the lower edge of this dam or splasher with the rim of the casing should be made water-tight. This splasher may be crescent shaped as shown in Fig. 1 and at its center it should equal the height of the bridge-wall or partition, 44. The object of the dam or splasher 46 is to prevent the water from beating against the lower edge of the removable lid 28 at its junction with the casing rim, thus obviating leakage. (See Figs. 1 and 6.)

Over the upper end of the outlet pipe 4, through which clean water is to be conducted to a cistern, may be placed a removable curved strainer or filter 47, made of fine wire cloth or other suitable filtering material. This removable screen or filter is not, however, essential and may be dispensed with.

Although the upper ends of the outlet pipes 3 and 4 may be circular, I prefer to have them flared from front to rear as shown in Fig. 2 and thereby increase their capacity for receiving at once all the water as it is discharged by the oscillatory deflecting spout, they being adjusted to elliptical outlet holes across the bottom of the casing.

When the oscillatory deflecting mechanism is in the normal position shown in Fig. 1, with the spout 23 and the waste pipe 3 in communication with each other, the first flow of water from the roof or other water-shed will pass through the gutter spout to the connected receiving spout 9, in which, by means of the elbows 10, the falling force of the water will be broken and somewhat lessened or retarded. From the spout 9 the water passes through the screen or filter 14 into the tank or breakwater 15 and thence, through the perforated bottom 16, to the deflector 21 at the lower end of the hopper. The breakwater 15 acts to still further lessen the force of the falling water. Should the flow of water be

considerable and finally fill the breakwater tank 15 a portion of the water will pass over the wall 17, and through the centrally located spout 19 which is arranged to direct this portion of the water directly onto the center of the centrally perforated deflector 21, which also receives a directly descending flow of water from the central, lateral series of enlarged perforations 20 in the perforated bottom 16, of the breakwater. A portion of the water falling onto the deflector 21 passes from its end onto the screen or filter 37 and through the same into the trough 35, while another portion passes through the central series of perforations 22 into the inclined trough 36 and thence through the trough 35 and outlet 35ª, into the hollow arm or cup, 33 of the oscillatory deflecting mechanism. Meanwhile, of course, the main body of soiled water from the roof passes down through the main deflecting spout, 23, to the waste pipe. During this operation the flange 43, and lips 45 immediately adjacent to the bridge wall 44, will prevent any escape of soiled water over said bridge-wall to the pipe 4, leading to the cistern. Although a portion of the water entering the hollow arm or cup 33 will escape slowly through its outlet 38, to the waste pipe 3, a sufficient quantity will be retained to permit a gradual filling of said cup until it thereby becomes so heavy as to overbalance the weighted arm 34 and thus oscillate or shift the spout 23 in such manner as to bring its lower end into communication with the pipe 4 leading to the cistern. Meanwhile the roof or water-shed has been washed off so that the cistern will now receive only clean water. When the oscillatory spout 23 thus shifts its position the balls or rolling weights 42 in the arm 34 will gravitate toward the inner end of said arm, their relative weight being thereby lessened, and by thus occupying a position near the center of the device, will serve to hold the spout steadily in the position that it has assumed, so that there may now be a continuous flow of clean water to the cistern. It is evident that as long as the rain fall continues the cup 33 will be kept filled with water and by its relatively increased weight will hold the spout 23 in communication with the cistern; but when the rain fall ceases the cup 23 will gradually lose all of its contained water through the outlet 38, the weight of the cup will diminish and be finally overcome by the weighted arm 34 in which the balls 42 will again roll to the outer end, and thus the spout 23 will be shifted back to its normal position in communication with the waste-pipe 3 in which position it will remain until the above described operation is repeated on recurrence of a sufficient rain-fall. It will be thus observed that the arms 33 and 34 are so arranged as to constitute automatically adjustable weights for causing the deflecting mechanism to oscillate automatically as required. The exit 38 being located at the lowest point in the bottom of the hollow arm or cup 33, no moisture will remain therein to form rust, and it will be observed, also, that all the parts of the apparatus are so arranged as to insure a perfect drainage and prevent the retention of any water after the device has performed its office. If desired, the various exit orifices or passages may be "tinned" or otherwise protected as an additional safeguard against rust. When the cistern is full, or if for any reason it is desired to prevent the further flow of water thereto, the oscillatory deflecting mechanism may be locked so as to remain in the position shown in Fig. 1 and thus conduct to the waste-pipe 3 all the water that may pass through the apparatus. For this purpose a small sliding bolt 48, may be mounted in bearings 49 on the top of the weighted arm 34 in position to engage an opening in a bearing or keeper, 50 attached in suitable position to the inside of the casing rim. When the bolt, 48, is thus engaged in the keeper 50 the spout 23 will be prevented from moving under the weight of any water accumulating in the cup 33 during a rainfall. In order to prevent the bolt 48 from slipping down into accidental engagement with the keeper 50, the rear end of the bolt is provided with a bent handle, 51, that, when the bolt is drawn back, may be turned down into engagement with a lug or stop 52 on the arm 34 and so hold the bolt in a retracted position and permit the apparatus to operate automatically in the manner described.

It may be noted that the hopper 13, the vertical oscillatory arm or spout 23 and the outlet pipes 3 and 4 are all more capacious than the down spouts from the roof and connected elbow spout 9, thus obviating any engorgement of rain water in the automatic cut-off and filter.

As shown in Figs. 2 and 5 it is preferable to provide the casing 1 with a removable front lid 28 which may have an annular flange 53, fitted closely around the rim of the casing. This lid or removable front 28 is preferably provided with a door 54, mounted on hinges 55, and having a handle 56, and a spring catch or other suitable fastening 57, so that by opening said door the interior of the apparatus may be inspected without removing the lid. The lid may also, if desired, be provided with a ring or handle 58, as shown in Fig. 5, and located at a place most convenient top or bottom. The lid 28 is removable for the purpose of placing within the casing and taking out of it the oscillatory, cruciform deflecting device 23, 33, and 34; also the bar 27 is removable for the same purpose.

What I claim as my invention is—

1. The combination of a casing 1; the pipes 3 and 4 leading therefrom; the hopper 13 provided with screen or filter 14; the tank 15 inclosed in said hopper and having a foraminous bottom 16 and discharge spout 19; the deflector 21 at the lower end of the hopper; the oscillatory deflector having a vertical hollow arm or spout 23, weighted arm 34 and cup

or hollow arm 33 provided with exit 38; the troughs 35 and 36 supported in the spout or vertical hollow arm 23 and communicating with the cup or transverse hollow arm 33; the filter 37 supported on the trough 35; and the removable filter 47 arranged across the space or passage that communicates with the discharge pipe 4, leading to the cistern, substantially as described.

2. The combination of the casing 1; the pipes 3 and 4 leading therefrom; the partition 44; the oscillatory deflector comprising a vertical hollow arm or spout 23 provided at its lower end with lips or flanges 43 and 45, the hollow transverse arm 34 inclosing weights 42 and provided with a bolt 48, the hollow transverse arm or cup 33 communicating with the vertical hollow arm 23 and arranged to receive water therefrom to overbalance the weighted arm, and the hopper 13, substantially as described.

3. The combination of the casing 1, having its lower portion provided with the partition 44; the spout 23 having at its lower end, lips or flanges 43 and 45 and provided with the weighted arm 34 and a hollow transverse arm 33 that communicates with and receives water from said spout, and the hopper 13, substantially as described.

4. The combination of a casing having in its top a hopper or inlet for water and provided at the bottom with a waste-pipe and with an outlet pipe to a cistern; a screen or filter in the upper part of the hopper; a breakwater located in the hopper below said screen; and a deflector at the lower end of the hopper; and an oscillatory cross-shaped deflector located in the casing and comprising a hollow vertical arm or spout having on one side a weighted arm and on the other side a hollow arm or cup adapted to receive sufficient water to overbalance the weighted arm and automatically shift the deflector spout, substantially as described.

5. The combination of the casing 1, the hopper 13 having screen or filter 14 and breakwater tank 15 provided with a foraminous bottom 16 having a central lateral series of enlarged perforations 20; the deflector 21 located at the bottom of the hopper and provided with a central series of perforations 22; the oscillatory spout 23 having troughs 35 and 36 and provided on one side with a hollow arm or cup 33 to receive water from the trough 35 and having on the other side a weighted arm 34; and the outlet pipes 3 and 4, substantially as described.

6. The combination of the casing 1; the partition 44 in the bottom of the casing; the dam or splasher 46; the outlet pipes 3 and 4; the deflecting device comprising an oscillatory spout 23 having flanges 43 and lips 45 at its lower end; and the removable front or lid 28, substantially as described.

7. The combination of the casing 1 having outlet pipes 3 and 4, the vertical partition 44 located in the bottom of the casing between said pipes; the dam or splasher 46 secured across the lower front portion of the casing; and the removable front or lid 28 having a door 54, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM W. BAYS.

Witnesses:
T. A. SNOW,
WILL BAYS.