H. L. KUENZLI.

WATER FILTER.

APPLICATION FILED APR. 11, 1916.

1,188,280.

Patented June 20, 1916.

FIG. 1.

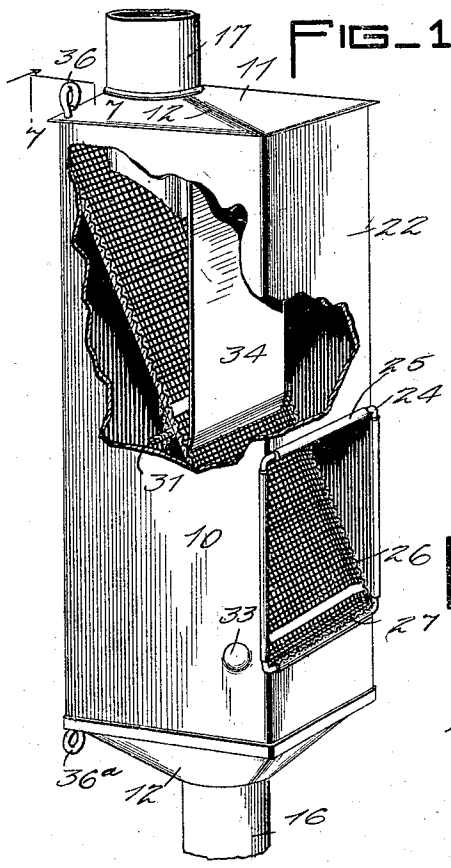


FIG. 2.

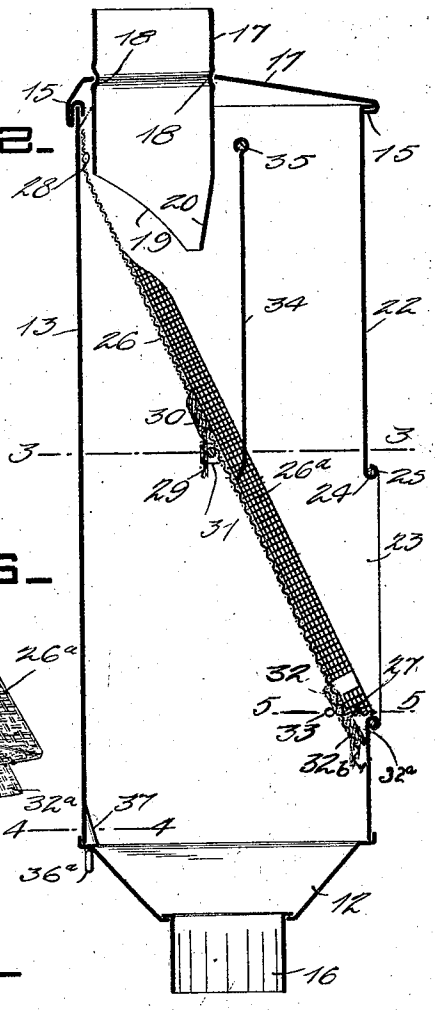


FIG. 6.

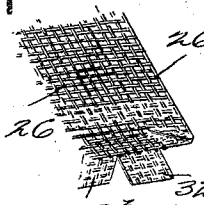


FIG. 3.

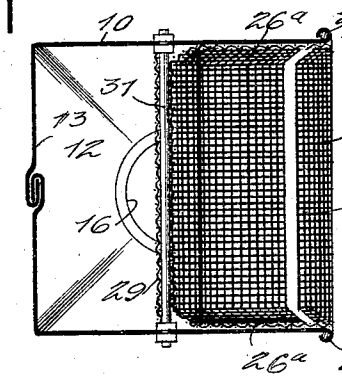


FIG. 4.

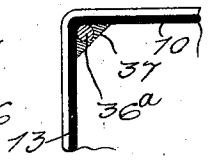


FIG. 5.

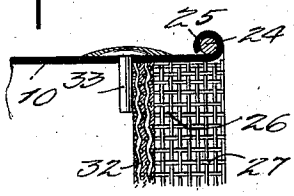
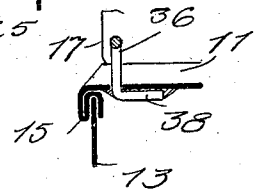


FIG. 7.



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WATER-FILTER.

1,188,280. Specification of Letters Patent. Patented June 20, 1916.

Application filed April 11, 1916. Serial No. 90,337.

To all whom it may concern:

Be it known that I, HENRY L. KUENZLI, a citizen of the United States, and a resident of Nevada, in the county of Wyandot and State of Ohio, have invented a new and useful Improvement in Water-Filters, of which the following is a specification.

My invention is an improvement in water filters, and has for its object to provide a device of the character specified, for interposition in the pipe leading to cisterns or other receptacles for rain water, and wherein mechanism is provided arranged within the length of the pipe and between the receiving and the delivery ends, for filtering the water during its passage and for removing sediment of all character from the water, and wherein the said removing means is so arranged that the action of the water coming on to the said means will clean the sediment from the cleaning means and deliver it outside the pipe.

In the drawings: Figure 1 is a perspective view with parts of the casing broken away to show the internal structure, Fig. 2 is a vertical section, Figs. 3, 4 and 5 are sections on the lines 3—3, 4—4, and 5—5, respectively, of Fig. 2, Fig. 6 is a detail perspective view of the lower end of the screen, and Fig. 7 is a section on the line 7—7 of Fig. 1.

The present embodiment of the invention comprises a casing 10 of approximately rectangular cross section having a top 11 substantially pyramidal in shape, and a hopper-shaped bottom 12 as shown, for permitting the easy escape of the water from the filter. The bottom 12 is provided with a central opening and a short pipe 16 extends from the opening, the pipe section having its inner end flanged within the bottom 12 to maintain the same in position, and the pipe section is attachable to a part of the cistern supply pipe.

The top 11 has an opening near the rear wall of the casing, and the inlet pipe section 17 extends through this opening, the said section being crimped or beaded as shown at 18 to receive the edge of the opening, and the lower end of the pipe section is beveled as shown at 19, terminating in a downwardly extended lip 20. The lip 20 is at the front of the pipe section, and it will be noticed from an inspection of Fig. 2 that the said lip inclines rearwardly for a purpose to be later described.

The opening in the top 11 for the pipe section 17 is at the highest part of the said top, and the edges 12 of the top extend to the corners of the casing, the crimp connection between the body and the top indicated at 15 in Fig. 2, forming a material reinforcement at these points. The front wall 22 of the casing is provided with a substantially rectangular opening 23 intermediate the ends of the casing and near the lower end, and the opening is reinforced by a frame 24 of wire or the like, the said wire being held in beads 25 formed from the material of the casing at the opening.

A screen is arranged between the inlet and the outlet with its lower end at the opening 23, the upper end of the screen being near the top of the casing and at the rear wall, while the lower end is at the lower end of the opening 23. The screen 26 is formed from heavy wire cloth of suitable mesh and preferably of considerable strength, in order to withstand the impact of foreign bodies that might enter the casing through the inlet 17.

The opposite sides of the screen are flanged forwardly as indicated at 26^a and these flanges extend from the lower end to near the upper end, and the upper end is bent at a slight angle to the body of the screen as shown at 28 to rest flat against the inner face of the rear wall. The lower end of the screen is bent in the same direction as the flanges 26^a as indicated at 27 and this flange 27 rests upon the lower edge of the opening 23, and upon the bead which incloses the frame 24 at this point. The ends of the flange 27 are soldered to the adjacent ends of the flanges 26^a as indicated in Fig. 6.

The screen 26 is supported and braced at about its center by a cross rod 31, connected with the opposite side walls of the casing. This rod as shown has its ends threaded and passed through openings in the walls, and lock nuts are threaded on to the ends on

opposite sides of each wall. That part of the rod within the casing contacts with the rear face of the screen, and the screen is provided with a divider 29 at the rod, consisting of a short section of the same material as the screen which is secured at one side edge to the rear face of the screen as indicated at 30 by means of solder or like material, in order to form an imperforate portion of the screen at this point.

The divider 29 depends behind the rod 31 and it is of a width to extend some little distance below the rod. The solder is so placed with respect to the divider that the reticulated material of the strip is converted into a substantially imperforate plate. The divider is in fact a solid body, being formed from the same material as the screen for purposes of convenience. At its lower end a deflector or divider 32 is arranged, the said deflector or divider being formed from a strip of the same material as the screen and secured thereto by means of solder or the like, and this strip is converted into an imperforate plate by means of the solder from its connection to its free edge. This divider 32 extends some distance below the flange 27, and below the lower edge of the opening 23 when the screen is in place and the central portion thereof, that is, all of the said portion except the extremities is separated from the said extremities and bent downward and backward as shown at 32^b, in order that when the screen is in place this portion 32^b will be spaced apart from the front wall of the casing and only the ends 32^a of the said portion will engage the said face of the casing. These portions 32^a prevent outward movement of the screen through the opening by their engagements with the front wall, and pins 33 are arranged in rear of the screen for preventing rearward movement of the lower end of the screen.

The pins 33 are connected with the opposite side walls of the casing, and they are so placed that when they engage the rear wall of the screen the portions 32^a will fit against the inner face of the front wall below the opening 23, and the flange 27 will rest upon the lower edge of the said opening. The purpose of the divider 29 is to prevent the passage of the water down the full length of the under surface of the screen and to deflect the said water downward from off the screen, in order that the lower portion of the screen may not be clogged by such water. A great portion of the water that falls from the pipe 17 on the upper part of the screen will pass through the screen, and during a heavy flow, unless some means were provided to prevent, a portion of the water passing directly through would flow down the rear side of the screen and would hinder the passage of the excess water through the lower part of the screen. With the deflector 29 however, the water cannot flow beyond the same and will pass down and drop off the free edge of the device.

The water passing beyond the deflector 29 on the screen might flow out at the opening 23 in certain circumstances were not the element $32—32^b$ provided. This deflector $32^a—32^b$ causes the water passing down the rear of the lower part of the screen to be deflected into the casing instead of passing out over the flange 27. It will be noted from an inspection of Fig. 2 that the solder 32 which connects the strip $32^a—32^b$ to the screen extends through the body of the screen at the upper end of the said strip $32^a—32^b$, forming a species of divider at this point on the forward or outer face of the screen. This solid portion is extended on to the flanges 26^a and its purpose is to divide the water on the front of the screen from that on the rear and that on the rear of the screen will pass down over the deflector $32^a—32^b$. That on the front of the screen may pass downward through the flange 27 which is perforate and not solid as is the divider $32^a—32^b$. The spacing apart of the portion $32^a—32^b$ from the front of the casing prevents any clogging or collection of water at this point, and since the portion 32^b does not contact with the outer wall of the casing and there is no impediment to the free downward flow of the water there will be no collection of water here to freeze in cold weather.

A splash board or plate 34 is suspended at its upper end from the cross rod 35 at a point slightly in front of the rod 31 and the splash board is of such length that it will engage the screen below the rod 31. The lower free edge of the board is curved rearwardly slightly as shown, and when the screen is taken out for any purpose the rod 31 will limit the rearward swinging of the plate 34 and the rod will hold the plate or board in such position that the screen cannot be inserted without lifting the plate out of the way. The solder 30 which connects the divider 29 to the screen extends to the front surface of the screens and acts as a divider to divide the water on the rear of the screen from that on the front of the screen in the same manner as the solder at 32. The splash plate 34 is of a width approximately equal to that of the casing and the lower end of the plate normally hangs in contact with the front of the screen or nearly so.

The free edges of the upturned sides 26^a of the screen fit against the side walls of the casing and the upturned edges or flanges thus in addition to their function of reinforcing the screen serve the additional function of leading the water downwardly

from the side edges of the screen toward the body. The said side edges also deflect foreign bodies on to the body of the screen and prevent them from becoming caught at the side edges.

The screen may be removed when desired by pushing upward on the lower end. The portion 28 of the screen slips up between the inlet pipe 17 and the rear wall of the screen a sufficient distance to permit the disengagement of the portion 32^a—32^b, and when the lower end of the screen is lifted through the opening 23 the entire screen may be withdrawn. In removing the screen, the strip 29 is of less width than the strip 32^a—32^b so that the lower end of the screen cannot become disengaged without disengaging also the divider 29 from the rod 31.

The length of the screen is such and the pins 33 are so arranged that the screen cannot be lifted high enough in the casing to permit the portion 32^b of the strip 32^a—32^b to move rearwardly of the pins 33. The portion 28 of the screen will engage the top of the casing before this disengagement may take place. The inlet pipe 17 is so arranged with respect to the casing that it forms a lock for the upper end of the screen when the screen is in place, that is, the portion 28 of the screen fits in behind the inlet pipe and between the same and the rear wall of the casing as shown more particularly in Fig. 2.

The entire device may be attached to any suitable support by attaching eyes 36 and 36^a. These eyes 36 have shanks 38 which extend through openings in the top 11 and at the rear corners of the casing and each shank is bent laterally forward as shown in Fig. 7, and is soldered to the inner face of the top. The lower eyes 36^a have straight shanks which are passed through openings in the bottom at the rear corners and soldered into place as indicated at 37. The shanks 38 of the eyes 36 are bent forwardly in order that they may not interfere with the top of the screen. The bend also gives additional strength since the bent portion of the shank engages beneath the top 11.

In use, when water flows through the inlet into the casing it falls upon the screen near its upper end, and the greater portion of the water passes through the screen directly. Any foreign bodies, as for instance, leaves, trash, and the like, cannot pass through the meshes of the screen, and they are held on the upper face thereof and washed downwardly by the fall of the water on the screen. The inclination of the screen is such that foreign bodies will not cling to the screen to clog the same and to prevent its proper operation. Such bodies will be immediately washed down by the falling water and will pass out at the opening 23 over the portion 27, being thus separated from the water and discharged outside of the casing. Since the water that falls during cold weather is the most desirable for storage, a device of the character in question to be thoroughly efficient must act in cold weather as well as in warm weather and must not be so arranged that the water will collect therein to freeze and to thus impair the usefulness of the filter. It is not difficult to separate the foreign bodies from the water, but they must also be discharged outside, in order to provide a mechanism that will act automatically without any attention whatever.

The improved filter will act indefinitely without the slightest attention after it has been once placed, all of the foreign bodies being discharged outside of the mechanism, while the water passes into the place of storage, no part thereof remaining in the casing or its connections. The splash plate 34 prevents any water that might rebound from the screen when it first strikes thereon from flying out at the opening 23. Any water that might rebound will strike the inner face of the splash plate and will flow down the same and will be turned back upon the body of the screen by the lower end thereof. This plate offers no resistance to the downward passage of the foreign bodies. Were such bodies of too great dimensions to pass between the free edge of the plate and the screen, such bodies would swing the plate forwardly to permit them to pass. It will be noticed that the lower end of the splash plate is just below the upper end of the opening 23. The plate however, is of such length and so arranged that when the lower end thereof swings forwardly it will engage the front casing wall at the upper end of the opening, so that the plate, even when in its most forward position, will not diminish the extent of the opening.

The screen is self-cleaning, all the foreign bodies of every character being discharged outside of the casing, while the water is discharged from the outlet 16. The screen is of sufficient strength to prevent injury through the impact of heavy foreign bodies, as for instance, brick bats, and the like, and such bodies are deflected outwardly through the opening 23.

I claim:—

1. In a filter, comprising a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen arranged within the casing between the inlet and the outlet and extending from the rear wall of the casing near the top to the lower end of the opening, said screen being of perforate material and having its side edges bent laterally and forwardly at an obtuse angle to the body of the

screen from near the lower end to near the upper end, the upper end of the screen being bent to lie flat against the rear wall of the casing, the lower end being bent forwardly to extend through the lateral opening at the lower end thereof, said screen having an extension extending downwardly in the plane of the screen and engaging the interior of the casing below the lateral opening, the casing having inwardly extending pins below the lower end of the lateral opening for engaging behind the extension to hold the lower end of the screen in place, said screen having an imperforate portion extending transversely thereof above the junction of the bent lower end with the body of the screen, said imperforate portion being spaced above the junction between the laterally bent portion and the body of the screen at the front of the screen, and extending downwardly on the rear face of the extension to a lower level than at the front of the screen.

2. In a filter, comprising a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen arranged within the casing between the inlet and the outlet and extending from the rear wall of the casing near the top to the lower end of the opening, said screen being of perforate material and having its side edges bent laterally and forwardly at an obtuse angle to the body of the screen from near the lower end to near the upper end, the upper end of the screen being bent to lie flat against the rear face of the casing, the lower end being bent forwardly to extend through the lateral opening at the lower end thereof, said screen having an extension extending downwardly in the plane of the screen and engaging the interior of the casing below the lateral opening, the casing having inwardly extending pins below the lower end of the lateral opening for engaging behind the extension to hold the lower end of the screen in place.

3. In a filter, a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen inclined within the casing between the inlet and the outlet and extending at its lower end below the said lateral opening, said screen being of perforate material and having its side edges bent angularly adjacent the side walls of the casing and having a drip divider consisting of a section of similar material secured at its upper edge to the lower surface of the screen intermediate the ends of the latter and having its lower portion bent to depend away from the lower face of the screen and toward the outlet of the casing, and means for supporting the said screen in position within the casing.

4. In a filter, a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen inclined within the casing between the inlet and the outlet and extending at its lower end below the said lateral opening, said screen being of perforate material and having its side edges bent angularly adjacent the side walls of the casing and having a drip divider consisting of a section of similar material secured at its upper edge to the lower surface of the screen intermediate the ends of the latter and having its lower portion bent to depend away from the lower face of the screen and toward the outlet of the casing, and means for supporting the said screen in position within the casing, said means including a cross bar secured to and extending through the casing between the lower surface of the screen and the said drip divider, as described.

5. In a filter, a casing having an inlet at its top and an outlet at its bottom, and having a lateral opening intermediate its ends, a screen inclined within the casing between the inlet and outlet and having its lower end terminating below the lateral opening, said screen being of perforate material and having drip extensions secured thereto at an intermediate point and adjacent its lower end, said drip extensions being formed of material similar to that of the screen and having lower free portions depending in spaced relation to the walls of the casing, and means for supporting the said screen in detachable relation within the casing.

6. In a filter, a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen inclined within the casing between the inlet and outlet and having its lower end terminating below the lateral opening, said screen being of perforate material and having drip extensions secured thereto at an intermediate point and adjacent its lower end, said drip extensions being formed of material similar to that of the screen and having their lower free portions depending in spaced relation to the walls of the casing, and means for supporting the said screen in detachable relation within the casing, said means including a cross bar intermediate the ends of the casing engaging the intermediate drip extension, and lower laterally projecting pins extending inwardly within the casing and engaging the lower drip extension.

7. In a filter, a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen inclined within the casing between the inlet and outlet and having its lower end terminating below the lateral opening, said screen being of perforate material and having drip extensions secured thereto at an intermediate point and adjacent its lower end, said drip extensions being

formed of material similar to that of the screen and having their lower free portions depending in spaced relation to the walls of the casing.

8. In a filter, a casing having an inlet at its top and an outlet at its bottom and having a lateral opening intermediate its ends, a screen inclined within the casing between the inlet and outlet and having its lower end terminating below the lateral opening, said screen being of perforate material and having drip extensions secured thereto at an intermediate point and adjacent its lower end.

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