No. 811,664. PATENTED FEB. 6, 1906.

L. V. ROOD.

FILTER.

APPLICATION FILED MAY 10, 1905.

Fig. 2.

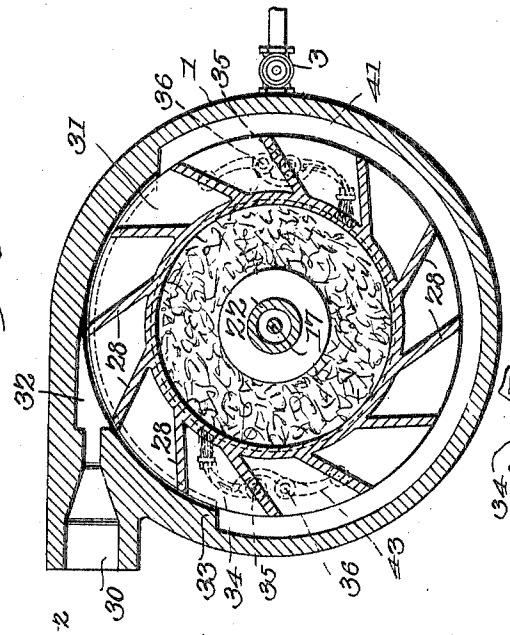


Fig. 3.

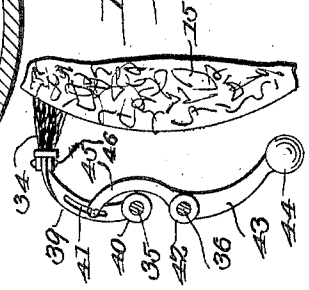
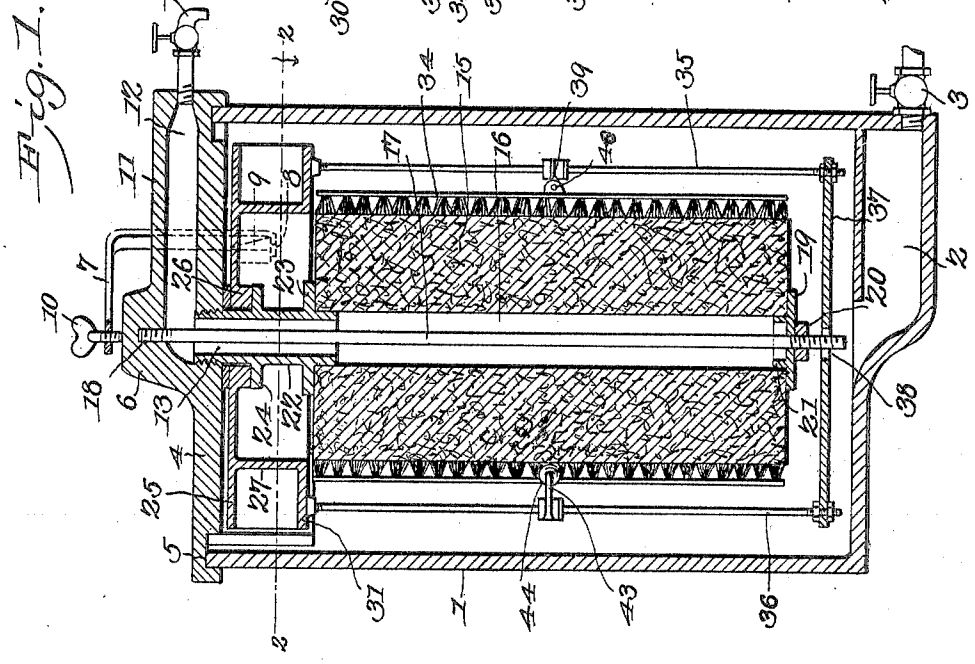


Fig. 1.



Witnesses

E. F. Stewart

J. N. Jochum, Jr.

Lloyd V. Rood,
Inventor

by Cushman & Co.
Attorneys

# UNITED STATES PATENT OFFICE.

LLOYD V. ROOD, OF MARIETTA, OHIO.

## FILTER.

No. 811,664. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed May 10, 1905. Serial No. 259,705.

*To all whom it may concern:*

Be it known that I, LLOYD V. ROOD, a citizen of the United States, residing at Marietta, in the county of Washington and State of Ohio, have invented a new and useful Filter, of which the following is a specification.

This invention relates to filters, and has for its object to provide certain new and useful improvements whereby the filter is capable of being connected to a source of water under pressure and is provided with novel cleansing mechanism which is automatically actuated by the water passing through the filter to cleanse the filtering element, so as to prevent accumulation of sediment thereon and to draw off the dirty water and sediment without fouling the filtered water.

It is designed to have the filtering element and the cleansing mechanism carried by the closure for the body of the filter to enable the convenient removal of these parts for repairs and cleansing of the interior of the body of the filter.

Other objects of the invention reside in the provision of novel means for automatically maintaining the cleaning mechanism in frictional contact with the filtering element and to automatically shift the cleaning members, so as to accommodate them to wear upon the filtering element.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a longitudinal sectional view of a filter embodying the features of the present invention. Fig. 2 is a cross-sectional view on the line 2 2 of Fig. 1. Fig. 3 is a fragmentary view showing the controlling mechanism for the cleansing device.

Like characters of reference designate corresponding parts in the figures of the drawings.

The body 1 of the present filter is preferably in the form of a cylindrical casing of suitable dimensions in accordance with the desired capacity thereof, the bottom of the body or casing being provided with a radial depression 2, extending from its center outwardly and provided at its outer end with a draw-off valve 3 for convenience in drawing off the dirty water.

For closing the open upper end of the case there is a top or cover 4, provided in its under side with an annular groove 5 to receive the upper edge of the body. At the center of the top or cover there is a central elevated portion or boss 6, across which extends an inverted substantially U-shaped clamp member 7, having its side members embracing the cover and the body of the filter with the lower extremity of each side formed into a hook 8 to take under a lug or shoulder 9 upon the exterior of the body, there being a set-screw 10 piercing the top of the clamp member and engaging the boss or extension 6, so as to snugly clamp the cover upon the body. In addition to the boss 6 the top 4 is provided with a substantially radial enlargement 11 upon its upper side, which is pierced by a passage 12, having its inner end in communication with a vertical central passage 13, formed through the cover. At the outer end of the passage 12 is a faucet or draw-off valve 14 for drawing off the filtered water.

Located centrally within the body is the filtering element 15, formed of some suitable porous material and pierced by a central longitudinal bore or passage 16, whereby the filtering element is tubular in form. For the support of this filtering element there is an upright rod 17, which passes through the bore of the filtering element and the passage 13 of the top or cover, with the upper end of the rod fitted into a threaded socket 18 in the top of the passage 13. Upon the lower portion of the rod 17 there is a plate or washer 19, which is held against the bottom of the filtering element by means of a nut 20, threaded upon the lower end of the rod 17, which, together with the rod 17, constitutes a hanger for the support of the filtering element. In addition to supporting the lower end of the filtering element the plate or washer 19 closes the open lower end of the bore or passage 16 in the filtering element, so as to prevent the dirty water from rising into the interior of the filtering element and commingling with the filtered water therein. The plate or washer 19 is provided with an upstanding concentric flange 21 to fit snugly within the bottom of the central passage or bore 16 of the filtering element to prevent lateral play of the latter at its bottom. For the same

purpose there is a tubular member 22, having its lower end fitting snugly within the top of the bore or passage 16 of the filtering element and its upper end threaded into the opening or passage 13 in the cover 4, there being an annular flange 23 to rest upon the top of the filtering element and another annular flange 24 disposed a suitable distance below the cover 4. In addition to preventing looseness of the upper end of the filtering element the tube 22 forms a continuation of the passage 16, so as to communicate the latter with the passage 12.

Within the space between the top of the filtering element and the cover of the body or casing 1 there is a horizontally-disposed water-wheel 25, provided with a hub 26, rotatably embracing the member 22 and supported upon the flange 24 thereof. Intermediate of the hub 26 and the outer edge of the wheel there is a pendent annular flange 27, from which blades or paddles 28 extend outwardly and disposed non-radially, as best shown in Fig. 2, so as to most effectively receive the impact of the incoming water through the inlet 30, formed through the side of the body or casing 1 of the filter. A substantially horizontal ring or plate 31 extends between the lower edge of the flange 27 and the outer edges of the paddles, so as to coöperate with the latter to form closed buckets for the reception of the water, whereby the wheel is driven steadily by the incoming water. It is preferred to have the inner end portion of the inlet 30 laterally enlarged, as at 32, so as to give a clearance to the incoming stream of water and prevent spreading thereof, whereby the water is compelled to strike the paddles in a compact stream, which produces a more effective rotation of the wheel. At opposite sides of the inlet 30 the body or casing 1 is provided with an internal enlargement or flange 33, fitting closely to the outer peripheral edge of the wheel and slightly underlapping the same, as indicated by the dotted line in Fig. 2 of the drawings, thereby to prevent the incoming water from escaping downwardly without actuating the wheel, said flange of course extending only a comparatively short distance around the body in order that there may be an annular space between the remaining portion of the wheel and the body to permit of the water escaping downwardly into the body of the filter.

It is proposed to maintain the exterior of the filtering element in a cleansed condition by means of one or more scraping elements, preferably in the nature of brushes 34, each brush being controlled by a centrifugal device to maintain the same in frictional engagement with the filtering element, said centrifugal device being shown in detail in Fig. 3. A pair of substantially parallel rods 35 and 36 depend from the under side of the water-wheel at opposite sides of the filtering element, the lower ends of these rods depending below the filtering element and connected by a cross-bar 37, there being an opening 38 in the middle of the cross-bar for the reception of the lower end of the rod 17. The brush 34 is carried by an arcuate crank-arm 39, which is provided with a sleeve 40, rotatably embracing the rod 35, there being a longitudinal slot 41 formed in the crank-arm 39. Upon the other arm 36 there is a rotatable sleeve 42, carrying a crank-arm 43, extending away from the crank-arm 39 and provided at its free end with a counterweight 44, there being an arcuate link 45 rigidly carried by the sleeve 42 and situated between the filtering element and the rod 35, with its free end provided with a pin or projection working in the slot 41 of the arm 39. When the filter is in operation, the tendency of the weighted arm 43 is to swing outwardly upon its pivotal support 36, wherefore the link 45, acting upon the crank-arm 39, tends to draw the brush 34 into contact with the filtering element, whereby this controlling device automatically compensates for wear upon the filtering element and the brush. By connecting the link 45 with the arm 39 at a point remote from its pivotal support 35 a comparatively short movement of the arm 43 will impart a much longer movement to the arm 39, thereby to insure a positive engagement of the cleaning device with the filtering element. The brush 34 is pivotally supported upon the arm 39 on a substantially horizontal axis 46, whereby the brush is capable of tilting vertically, so as to automatically accommodate itself to any uneven wearing of the outer surface of the filtering element.

In using the present device water is admitted through the inlet 30, whereupon the water-wheel is rotated by the incoming water and the brushes or cleaning elements 34 are rotated around the stationary filtering element 15. After the water escapes from the wheel and passes downwardly into the body 1 it percolates through the filtering element into the bore or passage 16, through which it rises to the passage 12 in the top of the cover 4 and may be drawn off through the cock or faucet 14. The dirty water may be drawn off through the cock or faucet 3 without fouling the filtered water within the filtering element. During the rotation of the cleaning mechanism around the filtering element the brushes will be maintained in frictional engagement with the filtering element under the centrifugal action of the counterbalanced crank arms or levers 43.

A very important feature of the present invention resides in the fact that the filtering element and the cleansing mechanism may be assembled upon the cover and then applied with the latter to the body or casing of the filter, which materially facilitates the setting up of the device, and these parts are

of course removable with the cover whenever it is desired to make repairs or to cleanse the interior of the body, thereby materially simplifying the setting up and taking apart of the device and enabling the maintaining of the device in a sanitary and operable condition.

There is an important advantage in taking the dirty water from the center of the lower portion of the filter by the passage 2, as it affords a clearance for the swirling water, and therefore the latter does not choke the rotating cleaning device, as might occur if the dirty water was carried off from a point at one side of the receptacle.

Having fully described the invention, what is claimed is—

1. A filter comprising a body having an inlet near its top, a cover having a draw-off passage communicating with a central passage piercing the bottom of the cover, a tubular filtering element hung from the cover, a tube hung from the cover and communicating between the bore of the filtering element and the central passage of the cover, a water-wheel mounted upon the tube in coöperative relation with the inlet, and cleansing means carried by the water-wheel and working in coöperation with the filtering element.

2. In a filter, the combination of a body, a cover having a draw-off passage centrally piercing the bottom of the cover, a tubular filtering element within the body, a hanger depending from the cover through the draw-off passage and the bore of the filtering element and connected to the latter, a tube depending from the cover with its lower end fitting the bore of the filtering element and its upper end in communication with the draw-off passage, the tube being provided with an external annular flange, a water-wheel having a hub rotatably embracing the tube and supported upon the flange thereof, and cleansing means carried by the water-wheel in coöperative relation with the filtering element.

3. A filter of the class described comprising a filtering element and a cleansing device mounted to rotate concentrically with respect to the filtering element and including a support working around the filtering element, a cleaning member having a crank-arm pivotally mounted upon the support, a centrifugal member pivoted upon the support independently of the arm, and a link carried by the centrifugal member and connected to the arm.

4. A filter of the class described comprising a filtering element and a cleansing device mounted to rotate concentrically with respect to the filtering element and including a support, a cleaning element having a crank-arm pivoted upon the support, a centrifugal member pivotally mounted upon the support independently of the arm, and a link rigidly carried by the centrifugal member and having a slidable connection with the arm.

5. In a filter, the combination of a casing, a filtering element therein, a water-wheel for actuation by the incoming water, a pair of substantially parallel rods hung from the wheel, sleeves rotatably mounted upon the rods, a crank-arm carried by one of the sleeves, a cleaning element carried by the crank-arm, a centrifugal member carried by the other sleeve, and a link rigidly carried by said other sleeve and connected to the arm.

6. A filter of the class described comprising a filtering element and a cleansing device mounted to rotate concentrically with respect to the filtering element and including a support working around the filtering element, a cleaning member mounted to swing upon the support, a centrifugal member mounted to swing upon the support independently of the cleaning member, and means connecting the centrifugal member and the cleaning member.

7. In a filter of the class described, the combination of a casing, a filtering element therein, a water-wheel for actuation by the incoming water, a pair of substantially parallel rods hung from the wheel, sleeves rotatably mounted upon the rods, a crank-arm carried by one of the sleeves, a cleaning element pivotally supported intermediate of its ends upon the crank-arm in frictional engagement with the filtering element, a centrifugal member carried by the other sleeve, and a link rigidly carried by said other sleeve and connected to the arm.

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

LLOYD V. ROOD.

Witnesses:
DAVID H. THOMAS,
S. A. PALMER.