No. 652,927. Patented July 3, 1900.

A. G. SHEAK.

WATER FILTER.

(Application filed Nov. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

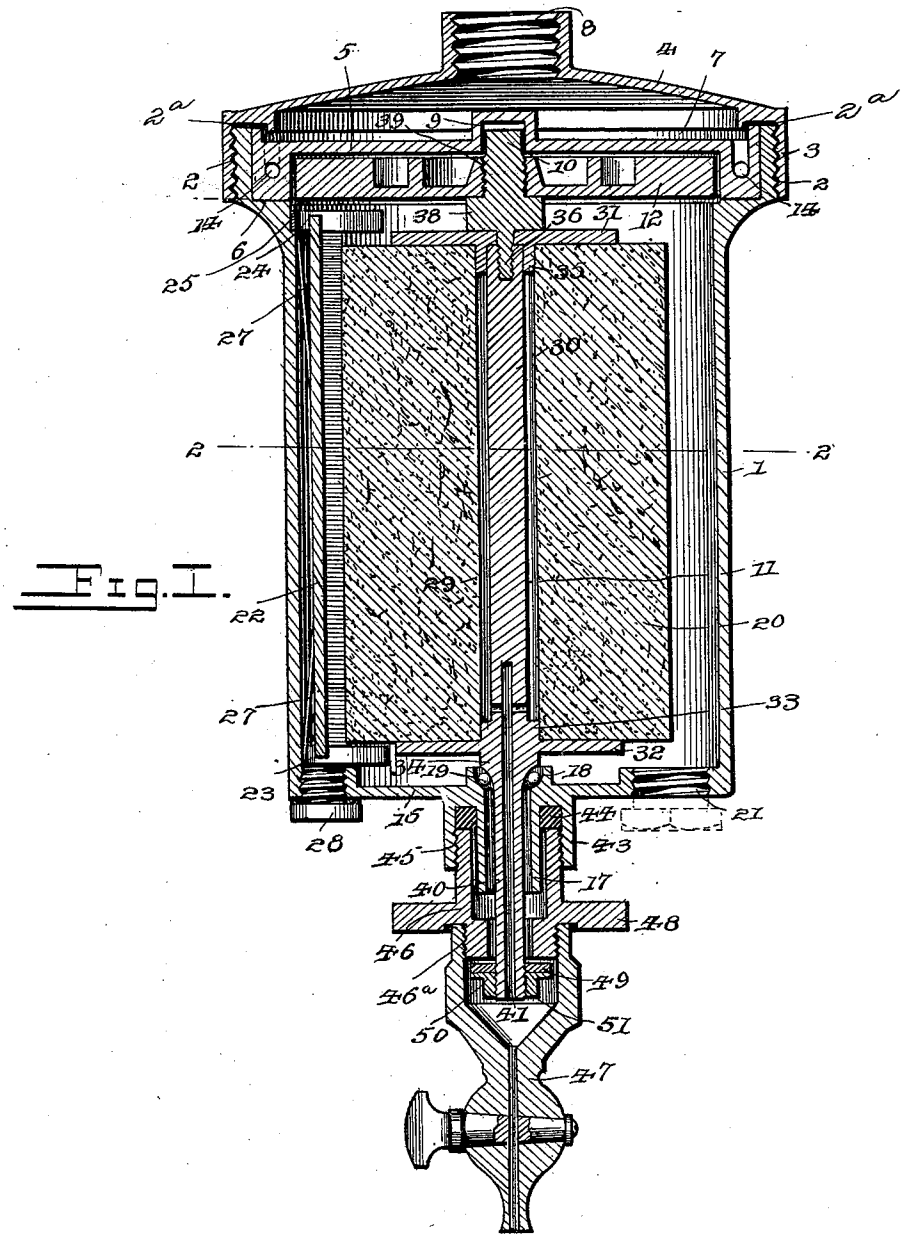

Fig. 1.

Witnesses
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Fig. 4.

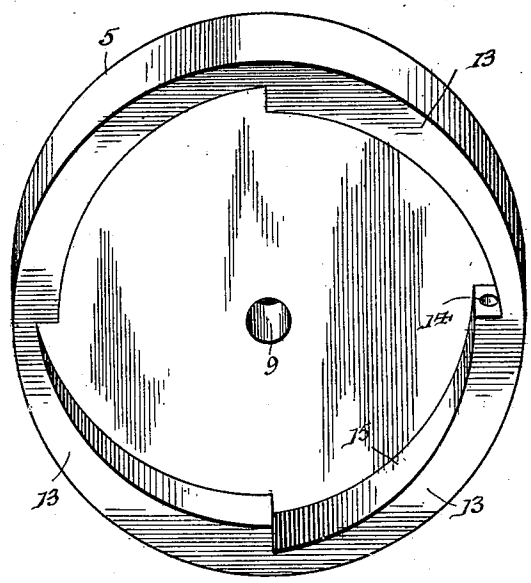
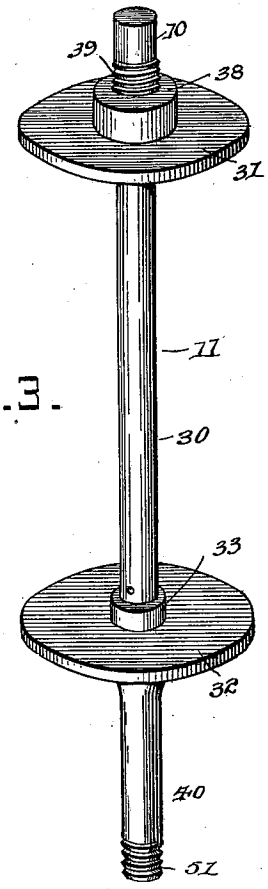
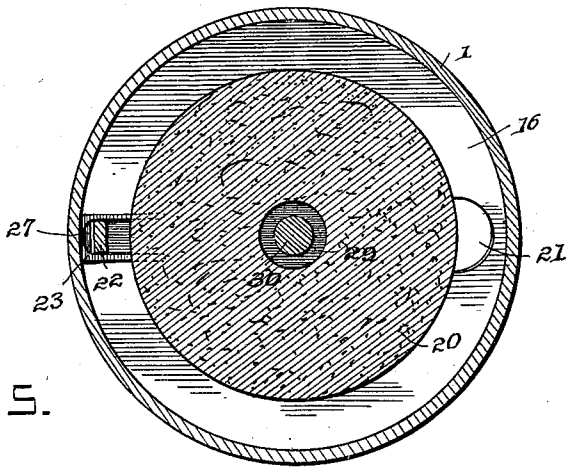


Fig. 2.

Fig. 3.





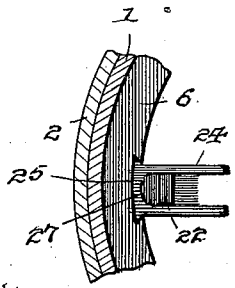


Fig. 5.

Witnesses
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UNITED STATES PATENT OFFICE.

ANDREW G. SHEAK, OF BINGHAMTON, NEW YORK.

WATER-FILTER.

SPECIFICATION forming part of Letters Patent No. 652,927, dated July 3, 1900.

Application filed November 7, 1899. Serial No. 736,161. (No model.)

To all whom it may concern:

Be it known that I, ANDREW G. SHEAK, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented a new and useful Water-Filter, of which the following is a specification.

The invention relates to improvements in water-filters.

The object of the present invention is to improve the construction of water-filters, more especially that shown and described in an application filed by me on or about September 6, 1898, Serial No. 690,278, and to simplify the same and lessen the cost of the construction thereof.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

In the drawings, Figure 1 is a vertical sectional view of a water-filter constructed in accordance with this invention. Fig. 2 is a horizontal sectional view on line 2 2 of Fig. 1. Fig. 3 is a detail perspective view of the frame which supports the inner filtering-casing. Fig. 4 is a similar view of one of the sections of the top of the outer casing. Fig. 5 is a sectional detail of the removable guide for the cleaning device.

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

1 designates an outer cylindrical casing provided at its upper end, which is enlarged, with exterior screw-threads 2, which are engaged by corresponding interior screw-threads of a depending annular flange 3 of an upper section or cover 4 of the top of the casing, said top being hollow and bearing against a shoulder or seat 6, formed by the enlargement of the casing, similar to the construction described in the said application. Instead of constructing the top of the casing in one piece, as illustrated in the said application, it is composed of a cover 4 and a lower separate section 5, fitting against the interior of the enlarged upper end of the casing and coöperating with the cover or upper section 4 to form an interior compartment, and a suitable packing 2^a is interposed between the sections at the upper edges of the outer casing.

The top of the casing, which is hollow to form the interior chamber 7, is provided at the center of its upper section or cover with an opening 8, interiorly threaded and adapted to screw on a water-pipe. The bottom or lower section 5 is inwardly offset and is provided at its center with a socket 9, forming a bearing for a shaft or journal 10 of a supporting-frame 11. The inwardly or upwardly offset lower section 5 forms a lower recess, in which is arranged a water-wheel 12 and which is substantially circular. The walls of the recess consist of a series of tapering portions 13, forming radially-arranged shoulders and provided with openings or passages 14, extending from the interior chamber 7 and having their lower terminals arranged to eject water horizontally. The curved faces 15 extend gradually inwardly and are adapted to direct the water discharged from the openings 14 against the water-wheel, whereby the latter will be rotated. The streams of water ejected from the passages or openings 14 are delivered upon the water-wheel in a direction substantially tangential with relation to the same and to the casing, and as they are arranged at intervals, as illustrated in Fig. 4 of the accompanying drawings, a positive rotation of the water-wheel is effected.

From the center of the bottom 16 depends a tube 17, and around the opening at the upper end thereof is a socket 18, forming a race for a series of antifriction-balls 19, upon which rests and revolves the frame 11, that carries a filtering-casing 20 of cylindrical form. The outer casing is provided at its bottom with an opening 21, adapted to receive a plug or a faucet and designed to enable the water to flow through it for a purpose hereinafter described.

At one side of the casing are arranged upper and lower substantially U-shaped guides, extending over the top and under the bottom of the inner filtering-casing and receiving a cleaning device 22, which is adapted to scour the exterior of the inner filtering-casing when the latter is rotated by the means hereinafter described. The cleaning device is preferably in the form of a stick of emery or natural

stone, and its ends are arranged in said guides. The lower guide 23 may be secured to the outer casing in any suitable manner; but it is preferably fixed to the same to mount it permanently in position. The upper guide 24 is designed to be removable to facilitate the assembling and the separation of the parts, especially the introduction and removal of the inner filtering-cylinder, and for this purpose it is provided with a dovetailed inner portion which is interlocked with a dovetailed groove or recess 25 of the outer casing, as clearly illustrated in Fig. 5 of the accompanying drawings. The cleaning device is held against the exterior of the inner filtering-casing by upper and lower springs 27, secured to the cleaning device and interposed between the same and the outer casing, and the construction of the guides is such that the cleaning device is advanced and supported in position as the inner casing is worn away. The bottom of the outer casing is also provided with a threaded opening located directly beneath the upper and lower horizontal guides, and this opening, which receives a removable plug 28, provides for the introduction and removal of the cleaning device and enables a new one to be readily supplied when necessary. The plug 28 is provided with a head forming a seat for a suitable packing, which provides a water-tight connection.

The inner filtering-casing, which may be of any desired form and which may be constructed of any suitable material, preferably consists of a cylindrical stone having a central longitudinal bore or opening 29, through which passes a shaft or spindle 30 of the supporting-frame 11. The supporting-frame 11 is composed of the said shaft or spindle 30 and upper and lower disks or plates 31 and 32, which engage the upper and lower ends of the inner filtering-casing, whereby the latter is securely mounted on the supporting-frame. The lower plate or disk 32 is preferably formed integral with the shaft or spindle, which is enlarged at the upper and lower faces thereof at 33 and 34. The enlarged portion 34 is tapered and rests upon the anti-friction-balls 19, and the upper enlarged portion 33 extends into the lower end of the bore or opening of the inner filtering-cylinder and closes the bottom of the latter. The shaft or spindle is of less diameter than the bore or opening of the inner filtering-cylinder to provide an interior compartment or chamber, and the upper disk or plate is provided with a depending annular flange 35, forming a socket to receive the upper end of the shaft or spindle and fitting into the upper end of the bore or opening of the filtering-casing. The upper plate or disk closes the upper end of the filtering casing or cylinder and is provided with a central aperture through which passes a screw 36, which engages a threaded socket of the upper end 37 of the shaft or spindle. The screw is provided with an enlargement or head 38 and is adapted to force the upper and lower plates tightly against the ends of the filtering-casing, whereby water-tight connections are provided. The screw is provided with an extension which forms the journal 10 and which is threaded at 39 to engage the water-wheel, and the latter is constructed similar to that shown and described in the application before referred to. The water-wheel is provided with a threaded aperture and is screwed against the head 38, whereby it is rigidly connected with the supporting-frame 11.

The lower portion 40 of the shaft or spindle extends through the depending tube 17 of the outer casing, and it is provided with a longitudinal opening or bore 41, which extends upward above the bottom of the interior compartment or chamber 29 of the filtering-casing, and it communicates with such compartment or chamber by transverse bores or openings, as clearly illustrated in Fig. 1 of the accompanying drawings.

The bottom of the casing is provided with a depending annular flange 43, arranged concentric with the depending tube and terminating short of the lower end of the same and forming an annular recess for the reception of a packing 44, and the said annular flange is interiorly threaded and is engaged by upper threads 45 of a nut 46. The nut, which has a tubular body portion, is provided with the upper screw-threads 45, and it has lower screw-threads 46^a, which are engaged by an interiorly-threaded end of a stop-cock 47, which controls the discharge of the filtered water. The nut is provided at an intermediate point with a handle portion 48, and its interior diameter is greater than the diameter of the lower portion of the shaft or spindle to provide a passage for water for a purpose hereinafter described.

The filtered water when the filter is in operation passes from the interior compartment or chamber of the filtering-cylinder to the stop-cock, and when it is desired to clean the filter the stop-cock is opened, the nut 46 is turned up to relieve the supporting-frame, and the plug of the opening 21 is removed to take the pressure from the interior of the filter and permit the water to escape at the exterior. The water is then ejected forcibly through the openings 14 of the top of the casing, and the water-wheel is caused to revolve rapidly. This causes the filtering cylinder or casing to rotate against the cleaning device, which, together with the flow of water, will rapidly and thoroughly clean the filter of all accumulations. The lower end of the nut 46 is normally seated against a packing 49, arranged on a shoulder formed by a flanged nut 50, which engages the threaded lower end 51 of the shaft or spindle. The flange is arranged at the upper face of the nut and forms a continuation of the same, as clearly illustrated in Fig. 1 of the accompanying drawings.

By raising the lower end of the nut 46 from the packing and the flanged nut an opening

is provided at that point and water is permitted to flow through the depending tube of the casing 1. After the filter has been cleaned the nut 46 is screwed tightly against the packing 49, which prevents any water from the exterior of the inner filtering-casing from passing through the bearing to the stop-cock. The packing 44 is preferably constructed of elastic material and is designed to be compressed sufficiently to permit the lower end of the nut to be lifted off of the packing 49, and when the nut is in engagement with the latter the packing 44 is also in engagement with its upper end.

What is claimed is—

1. A filter comprising an exterior casing, a top composed of two separate sections, the upper section forming a cover and engaging over the upper edge of the exterior casing, and the lower section fitting within the exterior casing, an interior rotary filtering-casing, a water-wheel connected with the inner casing, and a stationary cleaning device, substantially as described.

2. A filter comprising an exterior casing, a top provided with an interior chamber and composed of an upper section extending over the upper edges of the exterior casing, and a lower section fitting within the same and having a recess at its lower face forming a depending annular flange having openings or passages communicating with the said chamber, an interior rotary filtering-casing, and a wheel connected with the interior casing and operating in the said recess, substantially as described.

3. A filter comprising an exterior casing, an interior rotary filtering-casing, a water-wheel connected with the interior casing, the upper and lower substantially U-shaped guides located above and below the inner casing, and a cleaning device supported in the guides and engaging the exterior of the inner casing, substantially as described.

4. A filter comprising an exterior casing, an interior rotary filtering-casing, a supporting-frame consisting of a shaft, extending through the inner casing, a lower plate fixed to the shaft and engaging the lower end of the inner casing, an upper plate engaging the top of the inner casing, and a screw passing through the upper plate and engaging the shaft and adapted to clamp the said plates against the casing, and a water-wheel connected with the screw, substantially as described.

5. A filter comprising an exterior casing having a depending tube and provided with an annular flange concentric with the tube, an inner rotary filtering-casing provided with a depending tubular portion communicating with its interior and having a shoulder or seat, a nut engaging the said flange and arranged to engage the said shoulder or seat, and a stop-cock carried by the nut, substantially as described.

6. A filter comprising an exterior casing provided with a depending tube and having a concentric flange interiorly threaded and arranged adjacent to the tube to form a recess, an inner rotary filtering-casing having a depending tubular portion communicating with its interior and provided at its lower end with a shoulder or seat, a nut having a tubular body portion provided with upper and lower screw-threads and engaging the annular flange and fitting in the said recess, and a stop-cock having an interiorly-threaded end engaging the lower screw-threads of the nut, substantially as described.

7. A filter comprising an exterior casing, an inner rotary filtering-casing, the upper and lower approximately U-shaped guides located above and below the inner casing, one of the guides being detachably interlocked with the exterior casing, and a cleaning device arranged in the said guides and engaging the interior casing, substantially as described.

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

ANDREW G. SHEAK.

Witnesses:
HARRISON COWE PRICE,
JOHN A. BROWN.