(No Model.) 2 Sheets—Sheet 1.

J. W. HYATT.

CLEANSING FILTER BEDS IN SECTIONS.

No. 359,258. Patented Mar. 15, 1887.

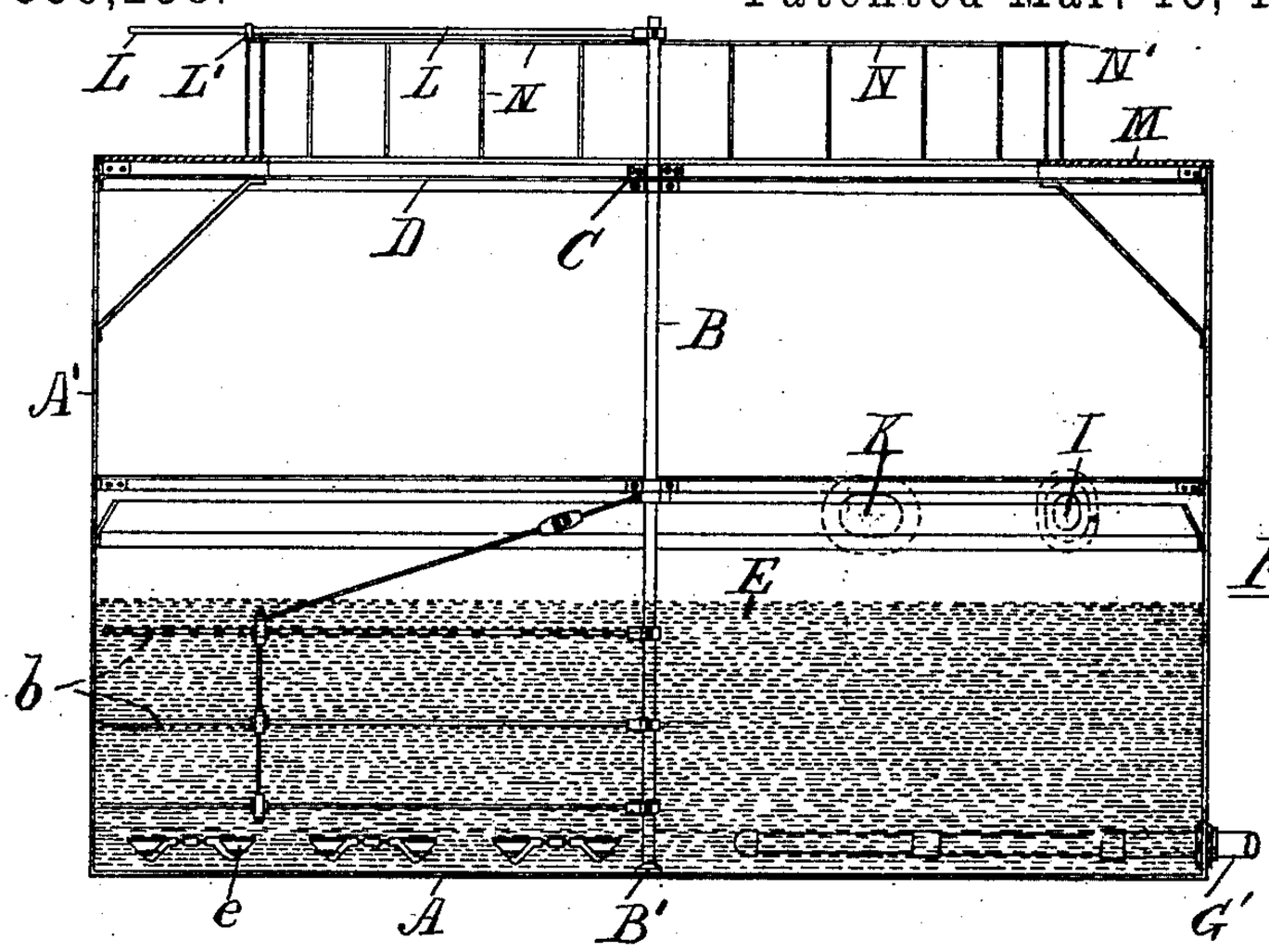

Fig. 2.

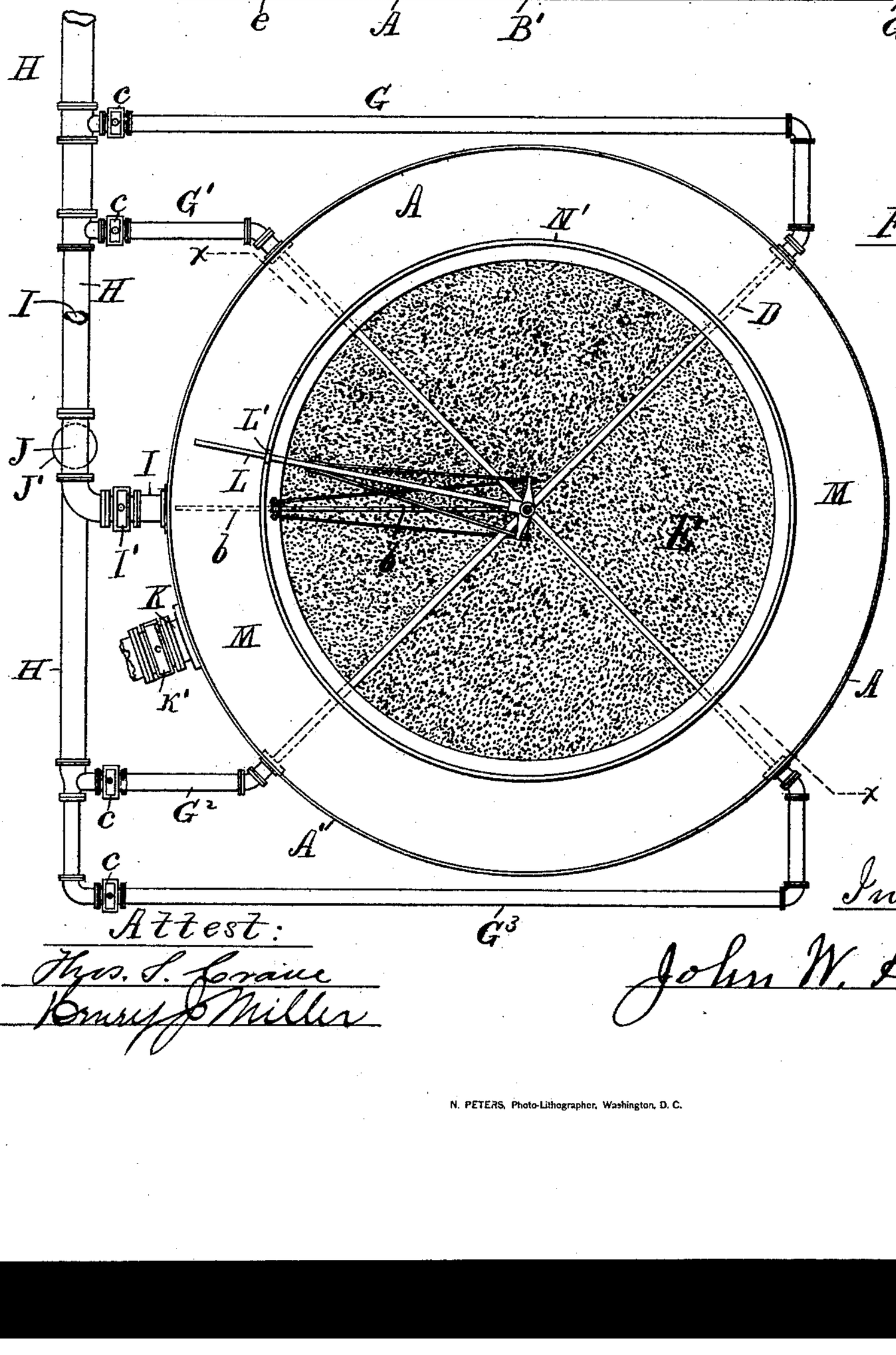

Fig. 1.

Inventor.

John W. Hyatt

Attest:

Thos. S. Sprague

Henry J. Miller

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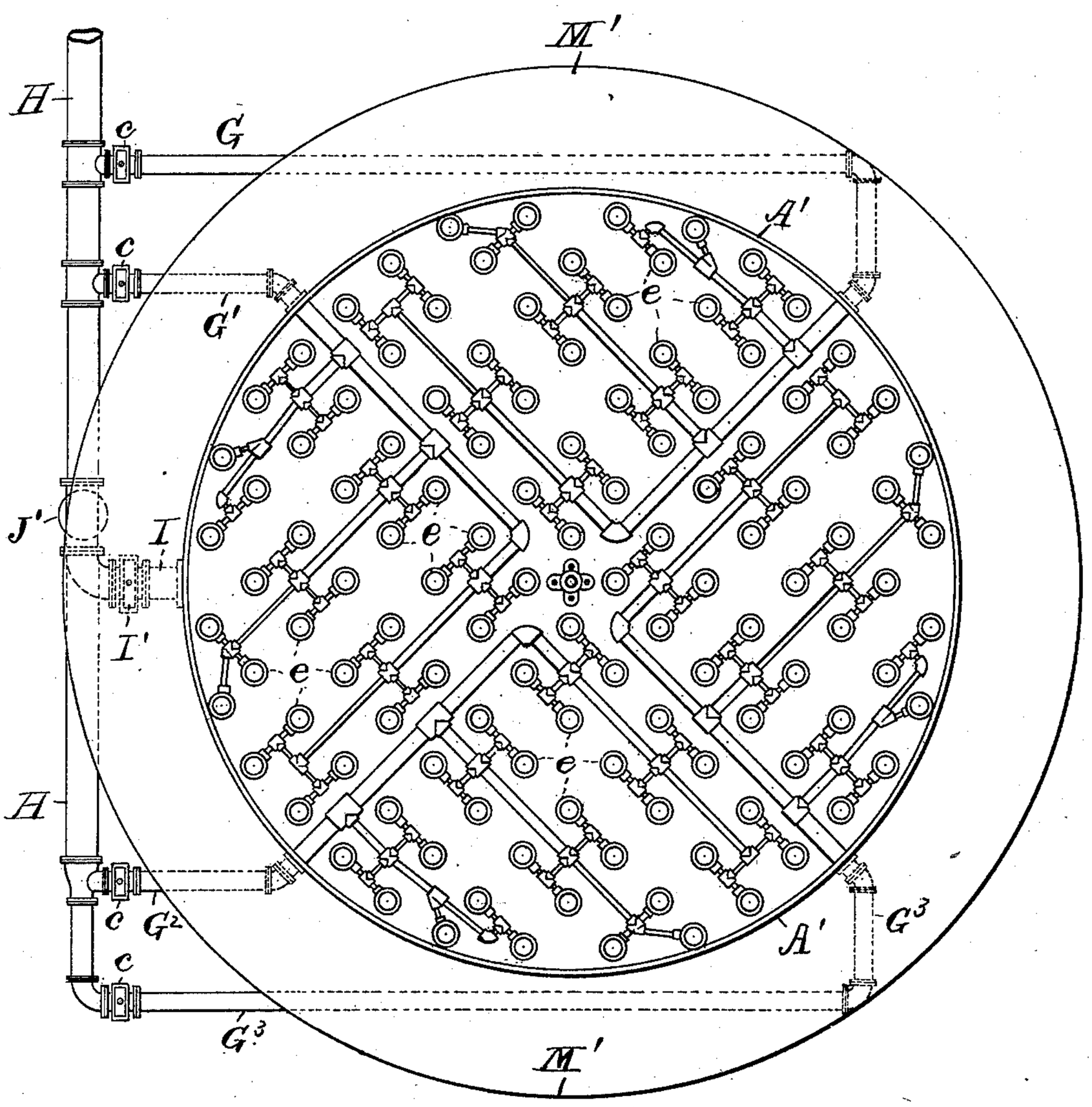

Fig. 3.

Attest:
Thos. L. Crane
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Inventor.
John W. Hyatt

UNITED STATES PATENT OFFICE.

JOHN W. HYATT, OF NEWARK, NEW JERSEY.

CLEANSING FILTER-BEDS IN SECTIONS.

SPECIFICATION forming part of Letters Patent No. 359,258, dated March 15, 1887.

Application filed July 14, 1886. Serial No. 207,959. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HYATT, a citizen of the United States, residing in Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Cleansing Filter-Beds in Sections, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to apply a reversed current of water to distinct sectors within the bottom of a circular filter-bed, so that radial sections of the latter may be agitated successively, and that radial stirring-arms mounted upon a vertical central shaft within the filter may be also moved successively through such radial sections of the filter-bed during the cleansing operation.

My present arrangement for the outlet-strainers, through which the reversed current is directed while cleansing the bed, is an improvement upon the construction for washing the filter-bed in sections, as allowed to me in my copending patent application, No. 202,221, and is expressly intended and adapted to facilitate the agitation of the several sections of the bed by arms projected radially from a central stirring-shaft. By such a construction I greatly simplify the mechanism for agitating the filtering material during the cleansing operation, and enable a single operator to successfully wash and agitate in sections all the parts of a circular filter-bed thirty feet in diameter.

My invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a plan of a thirty-foot filter-bed sustained in an open sheet-iron casing, with a platform for the operator around the exterior of the casing. Fig. 2 is a vertical section on line *x x* in Fig. 1, but showing an alternative construction for the platform; and Fig. 3 is a plan of the latter construction upon a smaller scale, with the outlet water-connections and the filter-bed within the casing.

The filter-casing consists merely in a bottom, A, and cylindrical shell A′, and is provided in the center with a vertical shaft, B, the lower end of which is sustained in a step, B′, and the upper end in a bearing, C, which is tied to the shell A′ by braces D. Stirring-arms *b* project from the shaft B nearly to the casing A′, and operate when the shaft is rotated to agitate the section of the filter-bed through which they are passed.

Conical outlet-strainers *e*, constructed as shown in my patent application No. 202,221, are represented upon the bottom of the casing, and are arranged in four series, each of sector or quadrant shape, divided by radial lines extending from the shaft B to the casing A′. The strainers are connected with outlet-pipes, which are shown inserted radially through the casing A′, and extend first to the step B′ in the center of the casing and then outward again toward the casing at an angle of about ninety degrees. Such outlet-pipe thus bounds a quadrant-shaped section of the bottom A, and is connected, by suitable branches, T's, and elbows, with all the strainers *e* which are located within such bounds. The entire system of outlets thus operate to collect the water filtered from the bed E and to deliver the water from the several sections, respectively, to the outlet-pipes G, G′, G^2, and G^3, which lead it to a discharge-pipe, H.

I is the inlet-pipe arranged to supply the impure water to the top of the casing by a cock, I′, and J is a branch of such pipe adapted to direct the water-current into the discharge-pipe H by a cock, J′.

K is a waste-pipe provided with a cock, K′, and the operation of filtering is effected by closing the cocks K′ and J′ and opening the cock I′ to introduce the filtered water above the level of the bed E.

The casing being made of sufficient height above the bed to produce the desired head or pressure, the water passes downward through the bed by gravity, and is discharged to the pipe H by the strainers *e* and the several pipes connecting them therewith.

When the surface or substance of the filter-bed becomes fouled by the accumulated impurities of the water, the water-supply is transferred from the top to the bottom of the bed by closing the cock I′ and opening the cock J′, thus directing the water-current into the pipes G, G′, G^2, and G^3 and strainers *e*. Each of the said outlet-pipes and its corresponding section of strainers may be cut off from the pipe H by a cock, *c*, so that instead of dissipating the entire force of the water-current among all of the strainers *e* it may be

concentrated in succession upon any one of the several sections which are connected with such pipe. The opening of a single one of the cocks *c* thus serves to loosen up a single section of the filter-bed by the introduction of the water from beneath, and tends to separate the impurities therefrom, which are then discharged from the casing with such water by the waste-pipe K.

As the filter-bed is liable to be compacted by continued use or by a slimy deposit from the water, the stirring-arms *b* are provided to agitate such section during the washing operation and to break up any masses that are not wholly disintegrated by the water-current.

As the resistance of the solid bed would entirely prevent all motion of the stirring arms or shaft, except the bed were loosened by the water-current, it is obviously necessary, when cleansing the bed, to first agitate such section as embraces the stirring-arms, and after using such arms to disintegrate that section of the bed to place it at rest close to the adjoining section of the bed, that it may in like manner be free to move through the latter when loosened. The means for rotating the stirring-shaft consists in a lever, L, extended over an annular platform, which may be sustained about the top of the tank, either outside or inside the casing A′.

In Fig. 2 the platform M is arranged inside the casing A′ at its upper edge, and is provided around its inner margin with a railing, N, carrying upon its top a circular track, N′. Such track serves to support the weight of the extended lever L, which is provided with a wheel or roller, L′, to rest upon such track. The platform affords a support for the operator to walk around the top of the filter and to move the stirring-arms through any desired section of the bed.

In Fig. 1 the platform is shown arranged at M′ outside the casing A′, and in such construction would be preferably affixed below the top line of the casing upon brackets at such a distance that the roller of the lever L could ride directly upon the top edge of the casing, as shown in the figure.

In various forms of closed filter-casings, such as I have described in my copending patent applications, Nos. 202,221 and 201,040, provided with means for washing the filter-bed in sections, it is obvious that the operator cannot determine the degree to which the filter-bed is broken up and agitated during the cleansing operation; but in my present construction the open casing A′ affords the most perfect facility for inspecting the filter-bed while its various sections are successively supplied with the reversed current and are agitated by the stirring-arms.

By the loosening of the filter-bed with the water-current the substance of the bed is so softened that it requires but little force to actuate the arms *b* back and forth within the quadrant or sector which is loosened, and the object effected by the movement of the stirring-arms is partly to ascertain when the washing operation is really perfected by the continued operation of the water upon the loosened particles.

Having thus set forth my invention, what I claim is—

1. The combination, with a circular filter, of separate series of outlets arranged in radial sectors within the bottom of the filter-bed, and radial stirring-arms adapted to agitate the filtering material over such sectors, as and for the purpose set forth.

2. The combination, with a filter having a circular casing, of separate series of outlets arranged in radial sectors within the bottom of the filter-bed, a vertical stirring-shaft in the center of such filter, a radial arm or arms projected from one side of such shaft toward the circular side of the filter, and means for rotating said shaft, as and for the purpose set forth.

3. The combination, with a filter having a circular casing, of separate series of outlets arranged in radial sectors within the bottom of the filter-bed, a vertical stirring-shaft in the center of such filter, a radial arm or arms projected from one side of such shaft toward the circular side of the filter, a lever affixed to the shaft, and a platform arranged about the periphery of the filter for an operator to actuate said lever, substantially as herein set forth.

4. The combination, with a filter having a circular casing, of separate series of outlets arranged in radial sectors within the bottom of the filter-bed, a vertical stirring-shaft in the center of such filter, a radial arm or arms projected from one side of such shaft toward the circular side of the filter, a lever affixed to the shaft, a circular track supported by the filter-casing, a roller upon the lever arranged to rest upon said track, and an annular platform adjacent to the track for an operator to move the lever, substantially as herein set forth.

5. The combination, with a filter having a circular casing, of separate series of outlets arranged in radial sectors within the bottom of the filter-bed, a vertical stirring-shaft in the center of such filter, a radial arm or arms projected from one side of such shaft toward the circular side of the filter, a lever affixed to the shaft and projected beyond the filter-casing, a roller upon the lever adapted to rest upon the top of the casing, and an annular platform supported upon the exterior of the casing below the top, and adapted to support an operator when actuating the lever, substantially as herein set forth.

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

JOHN W. HYATT.

Witnesses:
FRANK L. MORTON,
THOS. S. CRANE.