

No. 659,916.

Patented Oct. 16, 1900.

L. K. DAVIS.

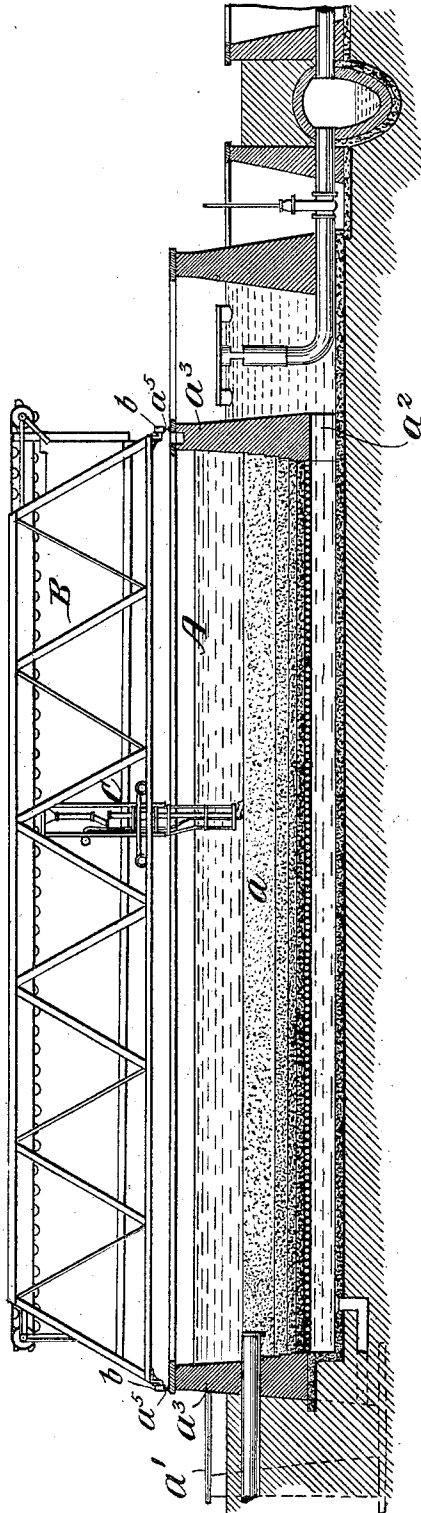
DEVICE FOR CLEANING AND REPLENISHING SAND FILTER BEDS.

(Application filed Apr. 17, 1899.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1,



WITNESSES:

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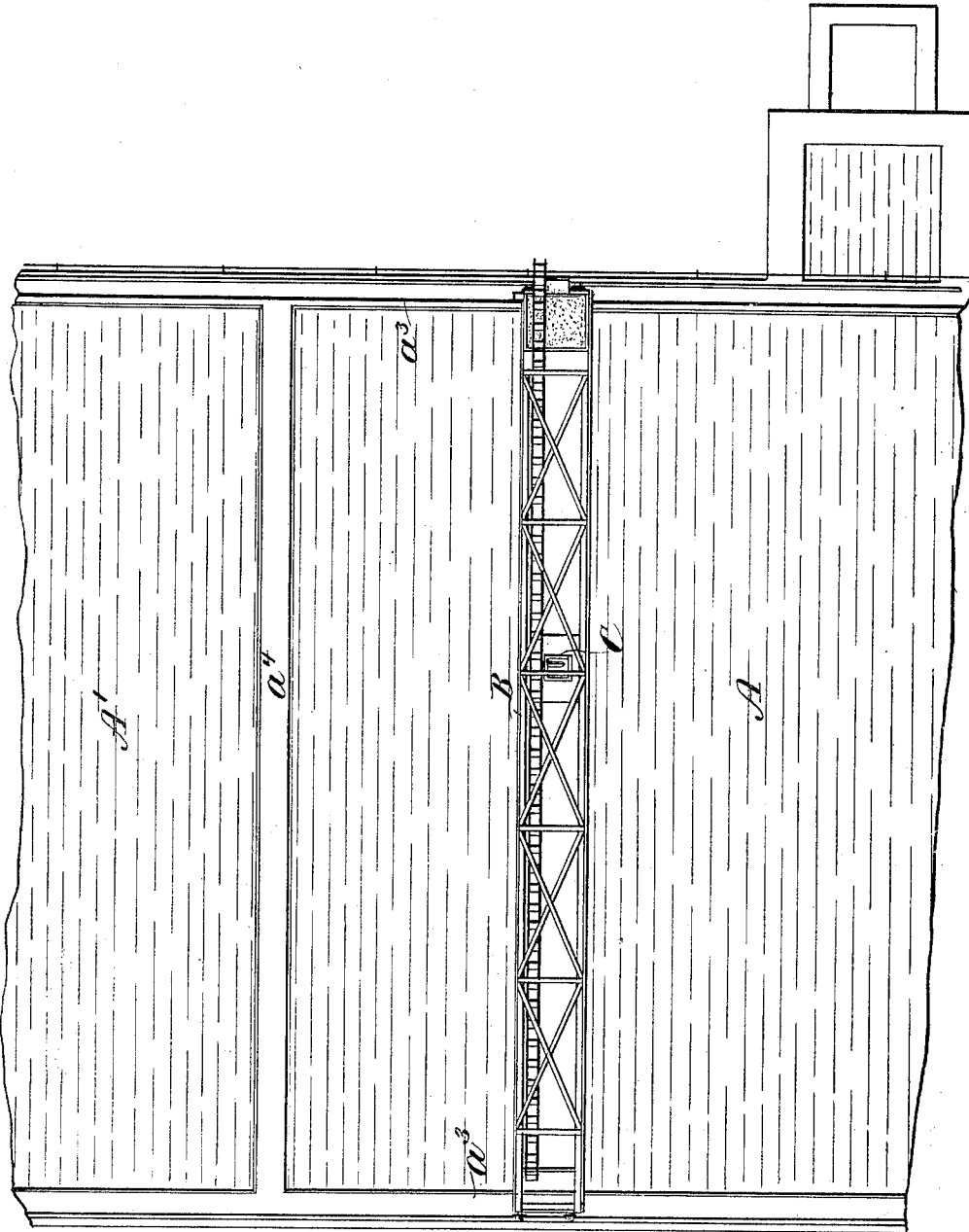
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(No Model.)

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Fig. 2,

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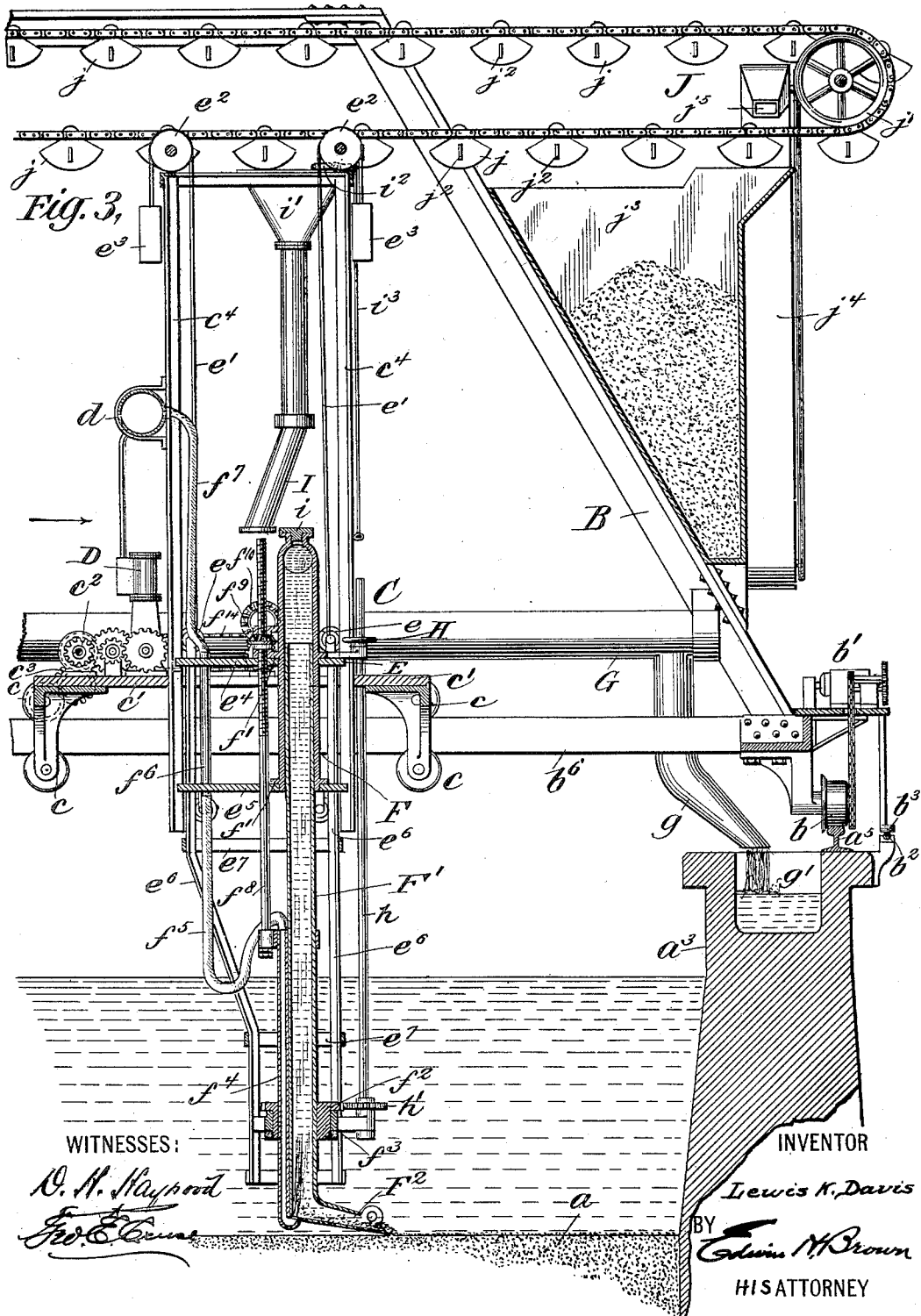
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4 Sheets—Sheet 4.

Fig. 4,

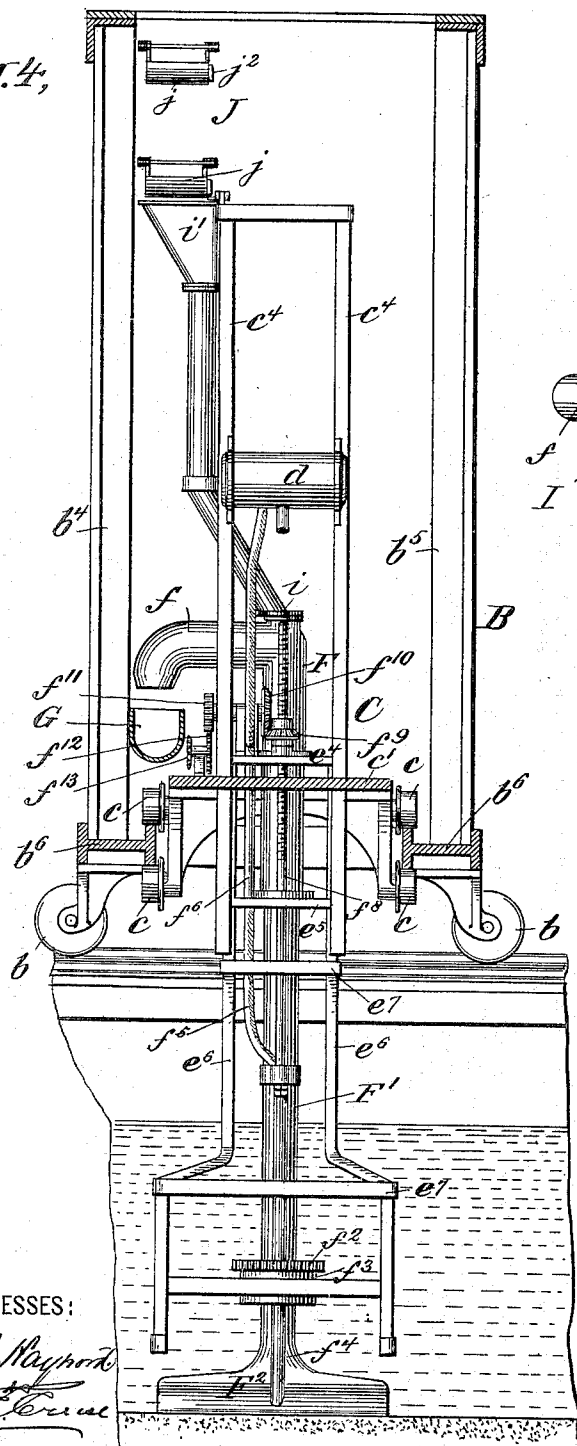


Fig. 5,

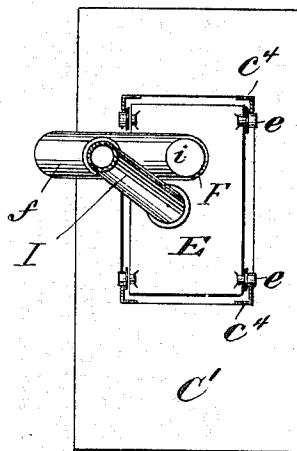
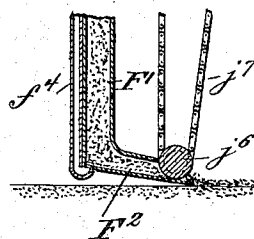


Fig. 6,



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UNITED STATES PATENT OFFICE.

LEWIS K. DAVIS, OF NEW YORK, N. Y., ASSIGNOR TO GRACE P. DAVIS,
OF SAME PLACE.

DEVICE FOR CLEANING AND REPLENISHING SAND FILTER-BEDS.

SPECIFICATION forming part of Letters Patent No. 659,916, dated October 16, 1900.

Application filed April 17, 1899. Serial No. 713,246. (No model.)

To all whom it may concern:

Be it known that I, LEWIS K. DAVIS, a citizen of the United States, residing in the borough of Manhattan, city and State of New York, have invented certain new and useful Improvements in Devices for Cleaning and Replenishing Sand Filtration-Beds, of which the following is a specification.

My invention relates to a device for cleaning and replenishing sand filtration-beds.

I will describe a device embodying my invention and then point out the novel features thereof in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of a sand filtration-bed and showing in elevation a device embodying my invention for cleaning and replenishing the sand filtration-bed. Fig. 2 is a top view of Fig. 1. Fig. 3 is a vertical sectional view, on an enlarged scale, of a cleaning and replenishing device embodying my invention. Fig. 4 is an end elevation of the device shown in Fig. 3 looking in the direction of the arrow. Fig. 5 is a detail view. Fig. 6 is a detail vertical sectional view.

Similar letters of reference designate corresponding parts in all of the figures.

A A' represent filtering-basins having a sand filtration-bed *a*. *a'* represents an inlet to one of said beds, and *a''* an outlet therefrom. The filtration-beds, inlets, outlets, and other parts are the same as usual.

a''' represents two opposite walls of the basin, and *a''''* a division-wall separating the basins A and A'. Along the top of each wall *a'''* is a rail *a''''*, on which wheels *b* of a carriage B travel. An electric motor *b'* is provided on the carriage B, which is geared with the wheels *b*, so that when the motor is operated the carriage may be moved longitudinally of each basin. Electric current is supplied to the motor through a shoe and connection *b''* from a conductor *b'''*, which may extend along one of the walls *a'''*. The carriage B is in truss form and comprises the sides *b''''* *b'''''*, which sides are united at their tops and ends. The channel-irons *b''''''* at the bottom of the side frames serve as tracks for wheels *c* of a carriage C, which is made to travel to and fro longitudinally of the truss-carriage B. The carriage C has a platform *c'*, on which is located a mo-

tor *c''*. This motor is adapted through intermediate gearing *c'''* to move the carriage C and also to operate a pump D. The platform *c'* is provided with an opening, and at each corner of said opening is secured an angle-iron *c''''*. These angle-irons are vertical to said platform and serve as guides for rollers *e* of a carriage E. This carriage E carries the device or means for cleaning the filtration-bed, and it is adapted to be moved vertically through the opening in the platform, so that the cleaning device or other means will be clear of a partition-wall when the device is transferred from one basin to another. Any desired mechanism may be employed for moving the carriage E vertically. In the drawings I have shown cords *e'*, passing over pulleys *e''*, journaled on the connecting-pieces of the angle-irons *c''''*, and having one of their ends connected to the carriage and their other ends provided with counterbalances *e'''*. The carriage may then be raised by hand, and the counterbalances will tend to hold the carriage in its raised position.

The carriage E comprises an upper platform *e''''* and a lower platform *e'''''*, which are connected by means of angle-bars *e''''''*. These angle-bars are braced and connected by cross-bars *e'''''''*. F represents a section of pipe having an outlet extension *f*. This section of pipe is provided with flanges *f'*, by which it is supported on the platforms *e''''* *e'''''*. F' represents a section of pipe, one end of which is fitted within the pipe F. This pipe F' is fitted in a collar *f''*, which collar has a turning bearing in a sleeve *f'''*, carried by the angle-bars *e''''*, and thus serves as a support. The lower end of the pipe F is provided with a closed scoop or shovel F'', which serves to take up a portion of the top layer of the filtration-bed. In case of a solid material being used as the filtration-bed the scoop or shovel would then act as a scraper. Extending alongside of the pipe F' and connected to it is a pipe *f''''*, which at its lower end is let into the pipe F'. This pipe *f''''* is for the purpose of conducting a blast into the pipe F', which, as shown, is directed upward to force out of the pipes F' and F the matter scraped or scooped up by the scoop or shovel F''. The matter escapes from the extension *f* into a

trough G, which is carried by the truss-carriage B. From the trough G the matter passes through an outlet *g* into a channel *g'*, provided in a wall *a*³. The pipe *f*⁴ is connected at its upper end by a flexible pipe *f*⁵ to a pipe-section *f*⁶, carried by the platforms *e*⁴ *e*⁵, and the section *f*⁶ is connected by a flexible pipe *f*⁷ with the receiver *d* of the pump D.

Provision is made for vertically adjusting the pipe *F'* and scoop or shovel *F*², and this may be accomplished by means of a screw-threaded rod *f*⁸, which is connected at one end to the pipe *F'* and a gear *f*⁹ on the rod *f*⁸. The gear *f*⁹ may be turned by means of a gear *f*¹⁰, meshing therewith, and carried by a shaft mounted on the platform *e*⁴. A gear *f*¹¹ is also on the same shaft, which gear meshes with a gear *f*¹², carried by a shaft mounted on the platform *c'*. A sprocket *f*¹³ is on this shaft, which may be connected by a chain *f*¹⁴ to the motor *c*².

The operation of this part of the device is as follows: The truss-carriage B is first moved to position in the basin to be cleaned and the carriage C moved along the carriage B to any point over the bed. The carriage E is then lowered and the shovel *F*² adjusted to scrape off a portion of the top layer of the bed, together with the sediment thereon. The engine is then started to force a continuous blast through the pipes *F'* and *F* and the carriage C moved along the carriage B, carrying with it the shovel *F*² to one of the walls *a*³. The matter scraped up by the shovel is forced out of the pipes into the trough G by the blast. The blast may be water or air. After the shovel has reached one wall *a*³ it is turned, and the carriage C, with the shovel, is then moved to the other wall *a*³. The shovel *F*², pipe *F'*, and blast-pipe *f*⁴ are turned or rotated by means of the hand-wheel H, carried on the rod *h*. The rod *h* is provided with a gear *h'*, which meshes with gear-teeth provided on the collar *f*². Instead of a blast for raising matter in the pipes *F* and *F'* the matter may be removed by suction. After the filtration-bed has been scraped the blast is shut off from the pipes *F* and *F'*. A swinging end I of a chute is then connected with the pipe *F*, a plug *i* being taken out of the pipe *F* to permit of this. The chute I has a hopper *i'* at its upper end, which is supported by the cross-pieces connecting the upper ends of the angle-irons *c*⁴. Sand is introduced into the hopper *i'* by means of the buckets *j* of a conveyer J. The conveyer J passes over sprockets *j'*, carried by the carriage B, and motion is imparted to the conveyer by any desired means. As the buckets pass over the hopper *i'* they are tilted by means of a pivoted lever *i*², which is raised to engage a projection *j*² on each bucket. The lever *i*² is operated by means of a rod *i*³. The sand is carried in a receptacle *j*³, carried by the carriage B, and the sand escapes from the lower portion thereof into a conveyer-chute *j*⁴, the dis-

charge end *j*⁵ of which is so positioned as to discharge into the buckets *j*. The conveyer in the chute may be operated from the conveyer J. When sand is discharged from the shovel onto the bed, a roller *j*⁶ is provided in its end, so as to produce an even discharge. The shovel or scoop is raised in order that the roller may be inserted, and the roller may be rotated by means of a chain *j*⁷, operated from any source of power.

What I claim as my invention is—

1. In a device for cleaning and replenishing sand filtration-beds, the combination of a scoop or shovel traveling over the same, a discharge-pipe connected with said scoop or shovel, means connected with said discharge-pipe for forcing matter out of said pipe and devices adapted to be connected to said scoop or shovel for supplying a filtering medium thereto.

2. In a device for replenishing the top layer of sand filtration-beds, the combination of a scoop or shovel traveling over the same, a chute connected therewith into which sand is emptied, and a conveyer for conveying and discharging sand into said chute.

3. In a device for replenishing the top layer of sand filtration-beds, the combination of a scoop or shovel traveling over the same, a device carried thereby for producing a uniform discharge therefrom, a chute connected therewith into which sand is emptied, and a conveyer for conveying and discharging sand into said chute.

4. In a device for cleaning sand filtration-beds the combination of a carriage movable along the bed, a second carriage movable along the first-mentioned carriage, means for producing a blast carried by said second carriage, a third carriage carried by said second carriage and movable vertically thereon, a discharge-pipe carried by said third carriage and with which the blast is connected, and a scoop or shovel carried by said discharge-pipe.

5. In a device for cleaning sand filtration-beds, the combination of a scoop or shovel traveling over said bed, means for turning or rotating said scoop or shovel, a discharge-pipe connected with said scoop or shovel, and a blast connected with said discharge-pipe.

6. In a device for cleaning sand filtration-beds, the combination of a scoop or shovel, traveling over said bed, means for adjusting said scoop or shovel vertically, means for rotating or turning said scoop or shovel, a discharge-pipe connected with said scoop or shovel and a blast connected with said discharge-pipe.

7. In a device for cleaning and replenishing sand filtration-beds, the combination of a main carriage traveling along the bed, a second carriage traveling transversely of the direction of travel of the first carriage, means carried by said carriages for cleaning the filtration-bed and other means carried by said carriages for supplying new filtration material to said bed.

8. In a device for cleaning and replenishing sand filtration-beds, the combination of a main carriage traveling along the bed, a second carriage movable on said main carriage, a device and means connected therewith for raising sand and other matter from said bed, a device movable along said main carriage for carrying new filtration material, and means for causing said device to discharge its contents onto the bed.

9. In a device for cleaning and replenishing sand filtration-beds, the combination of a main carriage traveling along the bed, a second carriage movable along said main carriage, means carried by said carriages for raising sand and other matter from said bed, a device movable along the main carriage for carrying filtering material, and means carried by said second carriage for supplying filtering material to said bed, said means being adapted to coact with said device to cause the device to discharge the filtering material carried thereby into said means.

10. In a device for cleaning and replenishing sand filtration-beds, the combination of a main carriage, traveling along the bed, a second carriage movable along the main carriage, means carried by said second carriage for raising sand and other matter from the filtering-bed, said means being also adapted to discharge filtering material onto the bed, a

conveyer movable along the main carriage and carrying filtering material, which is adapted to be discharged into said means and a device carried by said carriage for causing said conveyer to discharge its contents as the second carriage is moved along the first.

11. In a device for replenishing sand filtration-beds, the combination, of a main carriage movable along the bed, a device movable along said carriage and carrying filtering material, a second carriage movable longitudinally of said main carriage and means carried by said second carriage, into which said device is adapted to discharge the filtering material, for conducting the filtering material onto the bed.

12. In a device for cleaning sand filtration-beds, the combination of a main carriage traveling along the bed, a second carriage movable longitudinally of the main carriage means for cleaning the filtration-bed carried by said second carriage, a movable support for said cleaning means, and means for moving said support vertically.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEWIS K. DAVIS.

Witnesses:

THERON DAVIS,
PAUL SHELDON.