

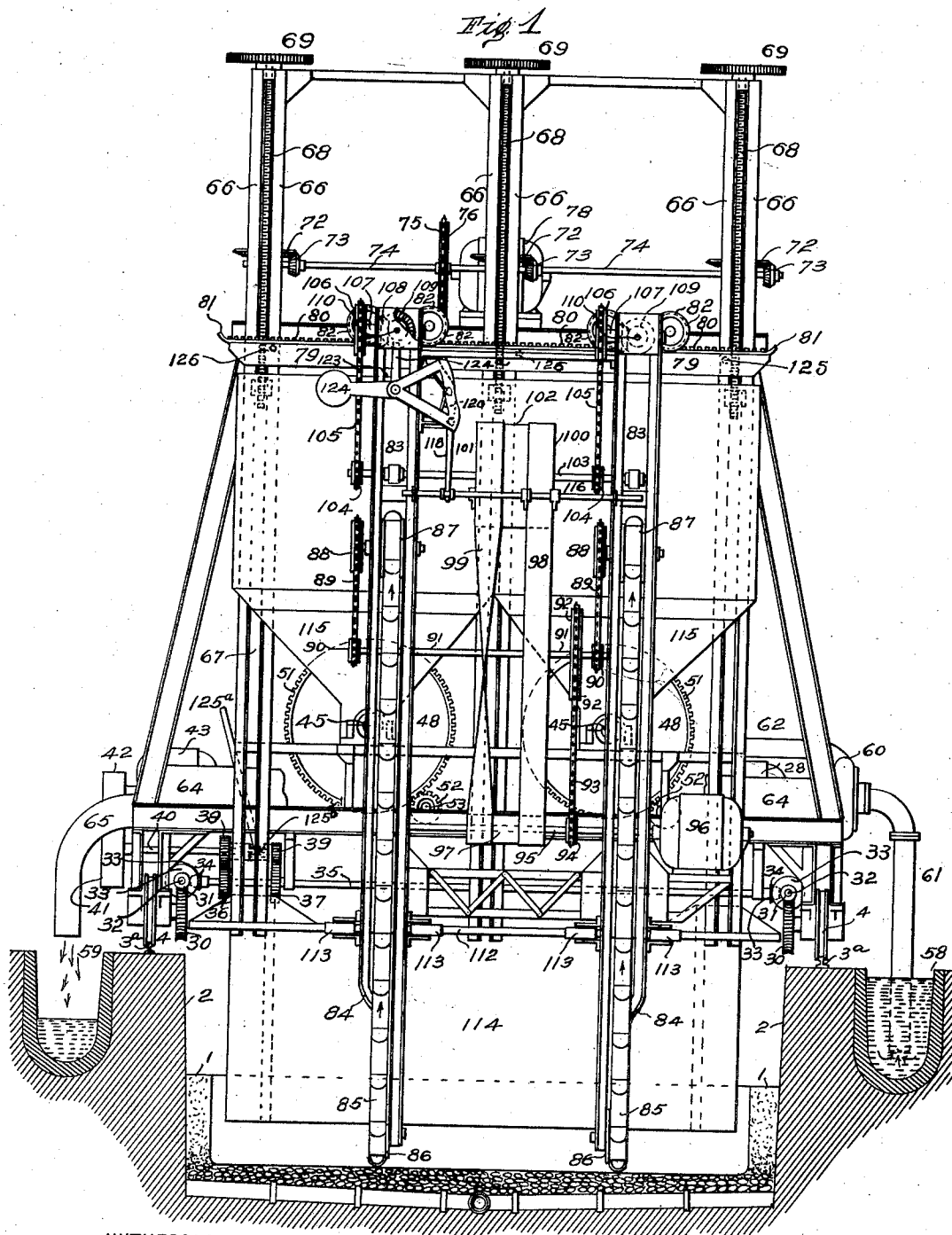
No. 845,744.

PATENTED MAR. 5, 1907.

H. W. BLAISDELL.
MACHINE FOR CLEANSING FILTER BEDS.

APPLICATION FILED OCT. 31, 1903.

4 SHEETS—SHEET 1.



WITNESSES:

Mrs. G. Cates.
A. A. Salinas.

INVENTOR

Hiram W. Blaisdell

BY

Charles S. Rogers
his ATTORNEY

No. 845,744.

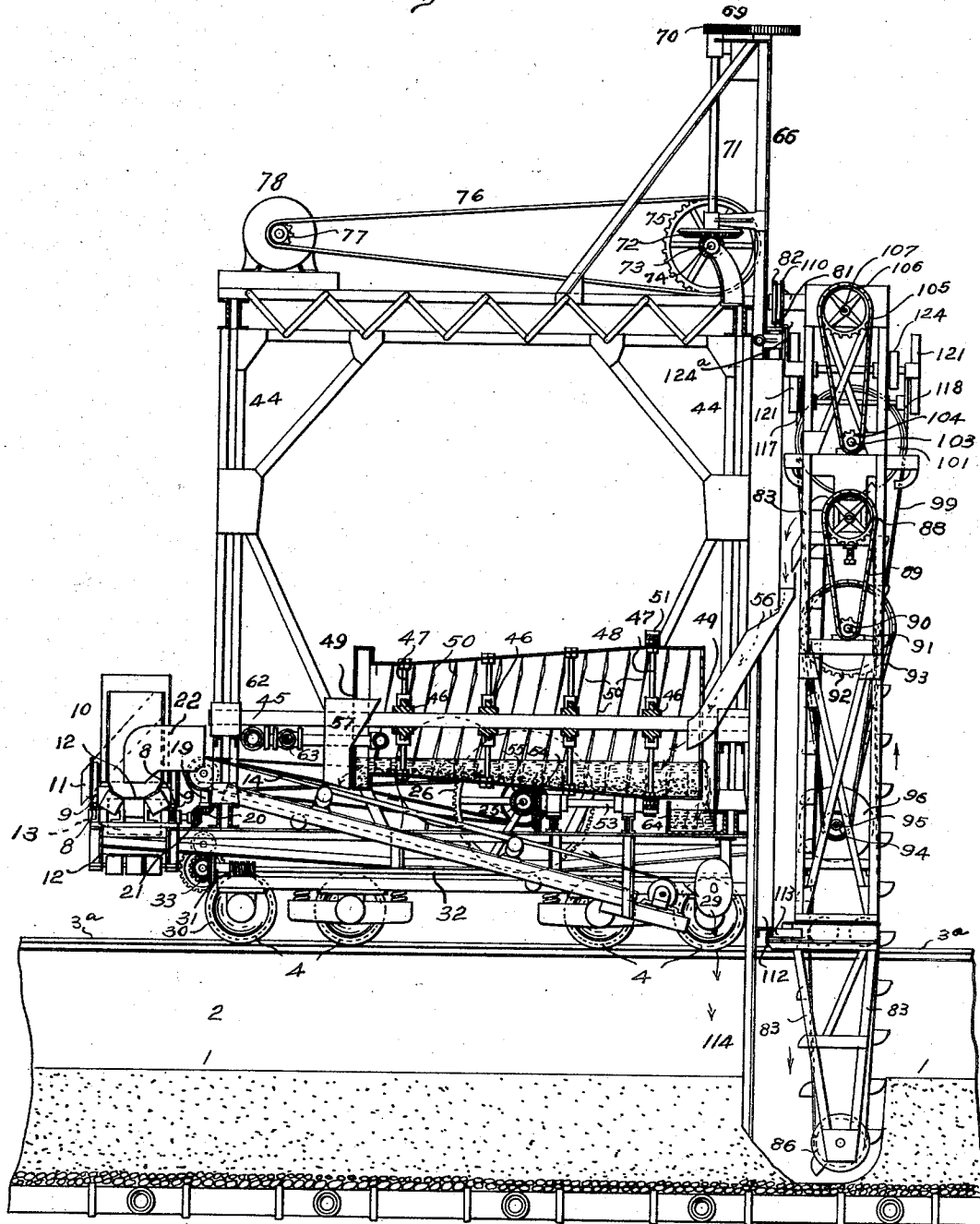
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4 SHEETS—SHEET 2.

Fig 2



WITNESSES:

Wm. G. Carter
Adams

INVENTOR

Henry W. Blaisdell

BY

Charles S. Rogers
his ATTORNEY

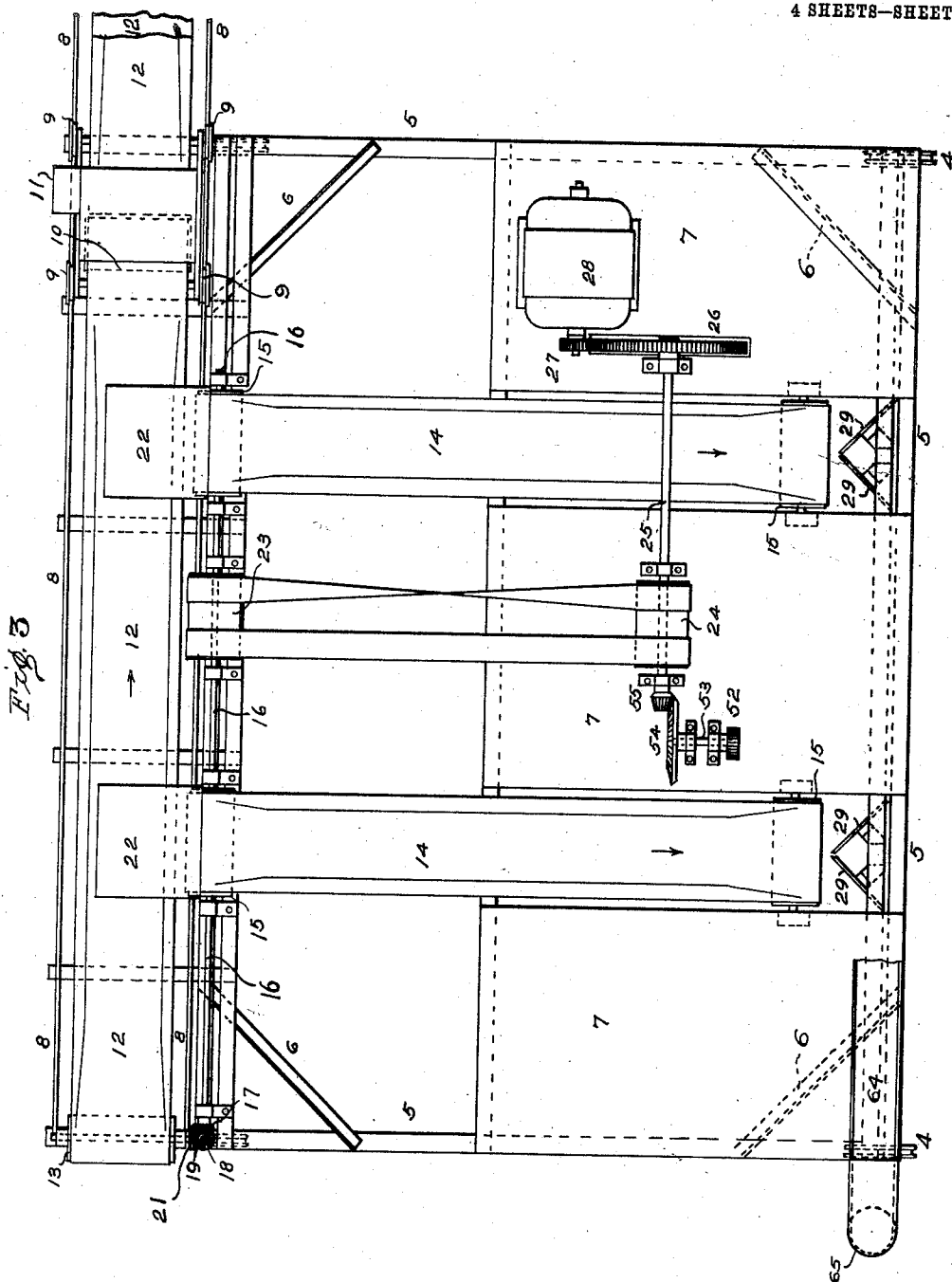
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4 SHEETS—SHEET 3.



WITNESSES:

Wm. G. Cates

W. H. H. H. H.

INVENTOR

Hiram W. Blaisdell

BY

Charles S. Rogers
his ATTORNEY

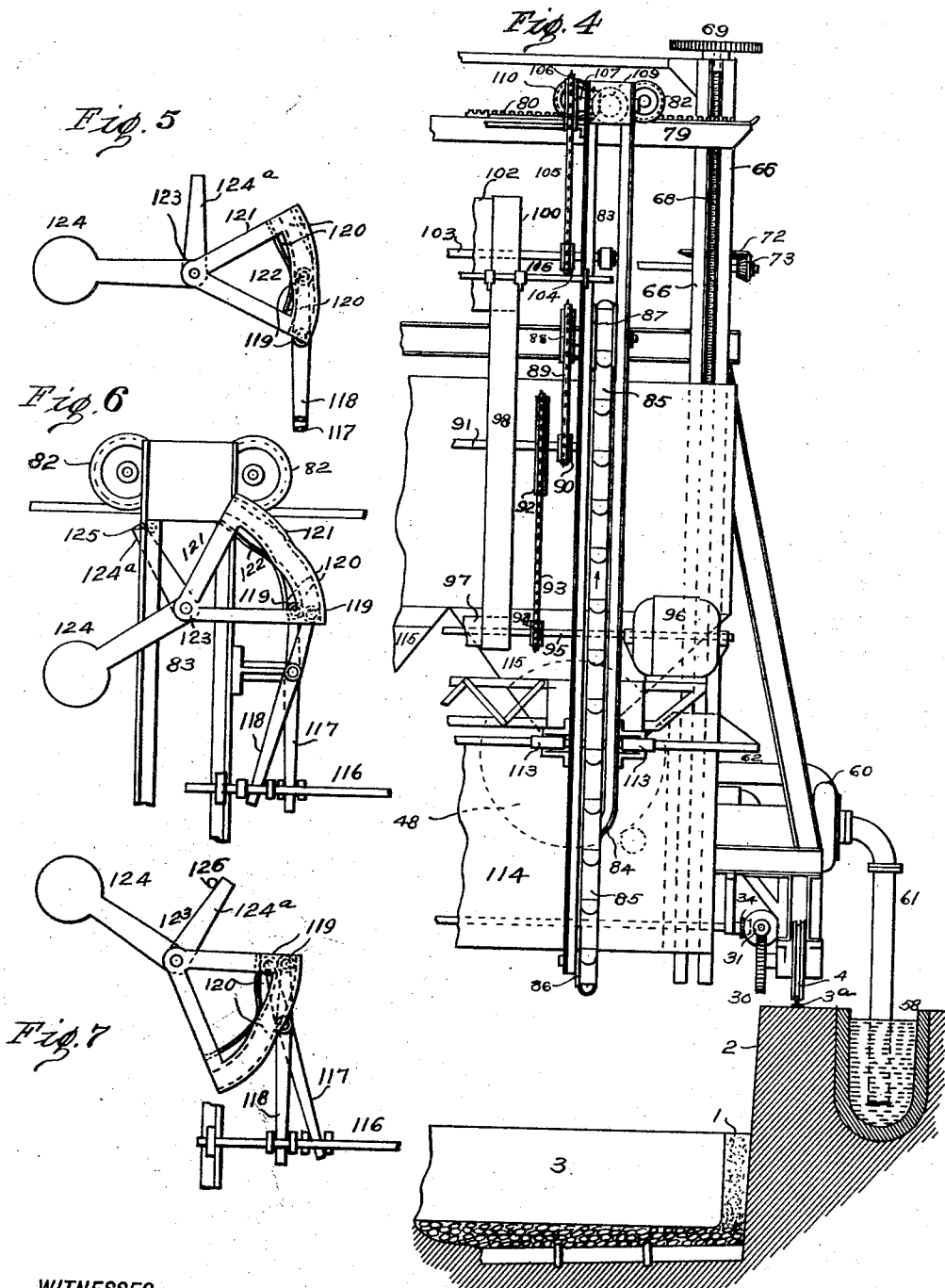
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4 SHEETS—SHEET 4.



WITNESSES:

Wm. L. Cates.

R. A. Balmage.

INVENTOR

Hiram W. Blaisdell

BY

Charles S. Rogers
his ATTORNEY

UNITED STATES PATENT OFFICE.

HIRAM W. BLAISDELL, OF LOS ANGELES, CALIFORNIA.

MACHINE FOR CLEANSING FILTER-BEDS.

No. 845,744.

Specification of Letters Patent.

Patented March 5, 1907.

Application filed October 31, 1903. Serial No. 179,396.

To all whom it may concern:

Be it known that I, HIRAM W. BLAISDELL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Machines for Cleansing Filter-Beds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines or apparatus for operating upon filter-beds, and particularly to machines constructed to handle the material composing filter-beds; and some of the objects of the invention are to produce such machines which will be comparatively simple in construction and efficient in operation.

It is an object of this invention to produce a machine constructed to cleanse the material constituting the filter-bed.

It is also an object of the invention to remove a portion or all of the material composing the filter-bed, cleanse the same, and then return the cleansed material to the filter-bed or transport the material beyond the filter-bed.

A further object of the invention is to provide for the transportation of the machine or apparatus over each filter-bed of a row and from one of such rows to another and to regulate the speed or travel of the machine, also for the travel or movement of the elevator or elevators along the supporting structure, and for the elevation and depression of the elevator or elevators.

With these and other objects in view the invention consists, essentially, in the construction, combination, and arrangement of parts, substantially as more fully described in the following specification and as illustrated in the accompanying drawings, forming part of this application, in which—

Figure 1 is a front elevational view of the apparatus or machine, the filter-bed and its walls being shown in section. Fig. 2 is a side elevational view of the construction shown in Fig. 1, the washer and filter-bed being shown in section. Fig. 3 is a top plan view of the traveling structure with the upper portion thereof removed. Fig. 4 is a fragmental elevational view illustrating the elevator and contiguous parts in an elevated position, and Figs. 5, 6, and 7 are detail views of the belt-shifting device.

Similar characters of reference designate corresponding parts throughout the several views.

Referring to the drawings, and particularly to Figs. 1, 2, and 4 thereof, the reference character 1 designates a filter-bed of any suitable material, preferably inclosed by parallel side walls 2 and end walls 3, and the filter-beds may be arranged in one or more parallel rows, with tracks or ways 3^a arranged upon the side and end walls to receive the supporting-wheels 4 of a traveling structure or bridge hereafter described. The main or body portion of the traveling structure preferably consists of a frame 5, having suitable braces 6 and partially floored or decked over, as shown at 7, Fig. 3, and the frame is preferably extended at one end to support tracks or ways 8, Figs. 2 and 3, whereon travel wheels 9, supporting a traveling discharging device or tripper 10, carrying a discharging-spout 11 to discharge the material beyond the filter-bed from which it had been taken. An endless-belt conveyer 12 may be mounted upon said extension over a drive pulley or roller 13, and a guide pulley or roller and said conveyer may be adapted to receive the material discharged thereupon by the inclined endless conveyers 14 when the direction of travel thereof shall have been changed, as hereinafter described, said conveyers being mounted upon pulleys or rollers 15, Fig. 3, those at one end being carried upon the driving-shaft 16, having a bevel-pinion 17, meshing with a similar pinion 18 on a shaft 19, carrying a bevel-pinion 20, meshing with a like pinion 21 in the shaft of the driving-roller 13 of the main endless conveyer, substantially as illustrated in Figs. 2 and 3 of the drawings. Hoods 22 may be disposed over the higher end of the inclined conveyers 14 to direct the material from the inclined conveyers 14 (when traveling in a reversed direction to that generally taken.) A wide band wheel or pulley 23 may be mounted on the shaft 16 and may be belted to fast and loose pulleys 24 on a shaft 25, carrying a large gear-wheel 26, meshing with a pinion 27 on the drive-shaft of a motor or other driving device 28, as shown in Fig. 3 of the drawings.

By means of the construction just described the inclined conveyers 14 are driven by the motor 28, and the main conveyer 12 is driven from the shaft 16, it being understood that the traveling tripper 10 may be moved to any position throughout the

length of the main conveyer 12 and that the hoods 22 may be hinged, so as to be thrown backward over the inclined conveyers 14 to permit of the passage of the tripper.

5 In order to effect the distribution of the cleansed material returned by the inclined conveyers 14 to the filter-bed, deflecting or distributing disks 29 or other devices, Figs. 2 and 3, may be revolubly mounted adjacent
10 to the lower end of said conveyers to receive the material therefrom and distribute the same.

The traveling structure is progressed over the several filter-beds preferably by means
15 of a worm-wheel 30, Fig. 1, on the shaft of each of the supporting-wheels 4, meshing with a worm 31, Figs. 1 and 2, on a worm-shaft 32, carrying a beveled pinion 33, engaging a similar pinion 34 on the transverse
20 shaft 35, provided with small and large gear-wheels 36 and 37, respectively, engaging a large and small gear-wheel 38 and 39, respectively, loose on a driven shaft 40, carrying a band wheel or pulley 41, belted to a
25 similar wheel 42 on the driven shaft of a motor or engine 43, as shown in Fig. 1 of the drawings. A suitable clutch 125^b, having a controlling-lever 125^a, may be provided upon the driven shaft 40 to throw one or the other
30 of the loose gear-wheels 38 and 39 into engagement with the shaft 40 to rotate the transverse shaft 35 and drive the supporting-wheels 4 rapidly or slowly, as may be desired for respectively transporting the traveling
35 structure to the place of operation or during the operation of cleaning the filter-bed.

Suitably secured upon the main or body portion of the traveling structure is a plurality of uprights 44, suitably braced and connected at the upper end thereof, substantially as illustrated in Figs. 1 and 2 of the drawings, and journaled in or upon said uprights are shafts 45, each having secured thereto a plurality of hubs 46, Fig. 2, carrying spokes or spiders 47, supporting a drum or cylinder 48, preferably tapered or inclined, substantially as shown in Fig. 2 of the drawings, and having a central opening 49 in each end thereof for the ingress and egress of material to be cleansed in the washer or cleansing-drum, and the same is preferably provided with helical internal ribs or vanes 50, constructed to progress the material toward the discharge end of the washer when the same is rotated, substantially as hereinafter more fully described.

Upon one end of the washer is preferably secured a master wheel or ring 51, Figs. 1 and 2, each whereof meshes with a pinion 52, Figs. 1, 2, and 3, on a shaft 53, carrying a beveled wheel 54, engaging a beveled pinion 55 upon the shaft 25, driven by motor 28, substantially as hereinbefore described and as illustrated in Fig. 3 of the drawings.

65 The elevated material is discharged into a

chute or trough 56, Fig. 2, from which it descends into the washer 48 through the opening 49 in the front end thereof and is progressed toward the rear end of the washer by means of the helical internal ribs thereof and the rotation of the same, passing out
70 through a hopper 57 upon the inclined conveyer 14, which carries the cleansed material toward the forward end of the machine or apparatus and discharges said material
75 against the deflecting plates or disks 29, which distribute the cleansed material over the filter-bed, substantially as before stated.

It will be understood that any number of washers may be employed that is found desirable in practice and that the construction and operation of each will be practically the same as that hereinbefore described in relation to one of the washers, two whereof are illustrated in the drawings forming part of
85 this specification, for the number of washers will correspond with the number of elevators that are employed.

A conduit or gutter 58 is preferably constructed in or adjacent to one of the side
90 walls 2 of the filter-bed, and a similar gutter or conduit 59 is desirably arranged in or upon the other side wall of the filter-bed, substantially as illustrated in Fig. 1 of the drawings, and in the gutter 58 is fresh or clear water or fluid adapted for use in facilitating the cleaning of material operated upon, and the water or fluid in the conduit 58 is preferably pumped therefrom by a centrifugal or other
95 pump 60, Fig. 1, by means of a pipe 61 and is conveyed through a pipe 62 into the rear end of the washer by means of a valved connection 63, Fig. 2 of the drawings, whereby the water or fluid is conducted into the discharging end of the washer 48 upon the material
105 therein to be cleansed, and when a sufficient quantity of water shall have been introduced into the washer the surplus passes out through the central opening 49 in the receiving end of the washer into a trough 64 and
110 thence into a pipe 65, emptying into a conduit 59, substantially as illustrated in Fig. 1 of the drawings.

Channel-irons 66 may be secured to or upon the uprights 44, so as to form channels 67
115 for the long screws or threaded rods 68, Fig. 1, carrying gear-wheels 69, meshing with pinions 70 on vertical shaft 71, carrying beveled gear-wheel 72, engaging beveled pinion 73, carried by a horizontal shaft 74, carrying a sprocket-wheel 75, connected by a sprocket-chain 76 with a small sprocket-wheel 77 on the drive-shaft of a motor or engine 78, Figs. 1 and 2 of the drawings, it being understood that each of the gear-wheels
125 69 are driven in the manner just described in relation to one set of wheels. The screws or threaded rods 68 have screw-threaded engagement with a transverse beam or truss 79, having rack 80 formed on or connected
130

therewith, and also a track or guide way 81, whereon travel wheels 82 on elevator-frames 83, the lower end whereof is preferably bent or deflected laterally, as at 84, Fig. 1, to allow the elevator to approach close to the walls 2 of the filter-bed, as will be readily understood.

Within the elevator-frames 83 (two whereof are shown in Fig. 1 of the drawings, but any number whereof may be employed) is mounted an endless bucket or other elevator 85, passing over guide and drive pulleys 86 and 87, respectively, each of the latter being provided, preferably, with a sprocket-wheel 88, connected by a sprocket-chain 89 with a sprocket-wheel 90 on a shaft 91, carrying a large sprocket-wheel 92, connected by a sprocket-chain 93 with a small sprocket-wheel 94, on a drive-shaft 95 of a motor or engine 96, as shown in Figs. 1, 2, and 4. The shaft 95 may also carry a wide band wheel or pulley 97, carrying a straight and twisted belt 98 and 99, respectively, which also pass over loose band wheels or pulleys 100 and 101, located on each side of a fast band wheel or pulley 102, all whereof are upon the transverse shaft 103, carrying a sprocket-wheel 104, connected by a sprocket-chain 105 with the sprocket-wheel 106 on a shaft 107, carrying a beveled pinion 108, meshing with a similar pinion 109 on a shaft 110, carrying a gear-wheel engaging the rack 80, whereby the elevator may progress from one side to the other of the apparatus or machine or from one end to the other of the track 81.

The actuating mechanism for the elevators has been described in connection with only one elevator; but it will be understood that the same operating mechanism is employed for each elevator. Therefore specific description of the operating mechanism for the other elevator will not be necessary.

A track or way 112, Figs. 1 and 2, may be formed on or connected with the channel-irons 66, preferably near the lower end thereof, and each elevator-frame 83 may be provided on each side thereof with a roller or wheel 113, constructed to travel on said track or guide way to support the lower end of the elevator in proper position during the operation thereof and to reduce the friction in the transverse or horizontal travel of the elevator across the front of the machine or apparatus when the cut is being made, as will be readily understood by those skilled in the art to which this invention appertains.

A shield or plate 114, Figs. 1 and 2, may have slidable connection with the channel-irons 66 or with the front part of the machine or apparatus and may engage each of the elevator-frames 83, so as to move with said frames when the latter are elevated, as hereinafter explained, and the function of this shield is to prevent the cleansed material

from coming in contact with the material to be cleansed or to separate the material which has been treated or cleansed from that to be operated upon.

Chutes or hoppers 115 may be suitably mounted upon the uprights 44 or in any other desirable manner and receive the material discharged thereinto by the buckets of the elevators and direct such material into the chute 56, which conveys the material into the washer, substantially as before explained.

In order to control the transverse travel of the elevators from one side of the filter-bed to the other automatically, there may be provided a belt-shift rod 116, Figs. 1, 4, 5, 6, and 7, with which engage interpivotated shifting-levers 117 and 118, carrying rollers 119, constructed to travel in the channel 120 of quadrants 121 and 122, attached to a bell-crank lever 123, one arm of which is provided with a counterweight 124, and the other arm of which lever is constructed to contact with stop pins or projections 125 and 126 upon the beam or truss 79, supporting the elevators, substantially as illustrated in detail in Figs. 5, 6, and 7 of the drawings.

The operation of the automatic shifting device just described is substantially as follows, to wit: When the arm 124^a of the bell-crank lever 123 contacts with the stop-pin 126, the roller 119 upon the interpivotated lever 118 is forced laterally into the eccentric portion of the channel 120, thereby throwing the free end of said lever laterally and moving the shifting rod 116 to the left and pulling the straight belt 98 upon the fast pulley 102, thereby reversing the direction of transverse travel of the elevators, as will be readily understood by those skilled in the art to which this invention appertains. The foregoing operation does not affect the position of the lever 117 or the belt 99 by reason of the roller 119 of said lever being within the concentric portion of the quadrant 122, and when the arm 124^a contacts with the stop-pin 125 at the end of travel of the elevator the opposite action takes place, and the belt 99 is pushed upon the fast pulley 102, as will be understood.

The operation of the entire apparatus will be readily understood from the foregoing description, when taken in connection with the accompanying drawings, and the following explanation thereof. To progress the apparatus or machine over the filter-beds to the position in which the same will be used, the clutch-lever 125^a, Fig. 1, will be thrown, thereby causing the clutch to engage the gear-wheel 38, meshing with the wheel 36 on the transverse shaft 35, thereby imparting a rapid motion to the latter, which carries beveled pinions 34, meshing with the beveled gear-wheel 33 on the worm-shaft 32, the worm 31 engaging with the worm-wheel 30

on the shaft of the supporting-wheels 4; but when the machine or apparatus is in operation the same is to be progressed slowly to afford the elevators time to operate upon the material. Therefore the clutch-lever is thrown so as to cause the clutch to engage the gear-wheel 39, meshing with the gear-wheel 37 on said transverse shaft 35, imparting a slow motion to the latter and rotating the supporting-wheels 4 slowly by means of instrumentalities just described in connection with the wheels 38 and 36. When the apparatus shall have reached the proper position over the filter-bed to begin operation, the motor 78 is started, thereby driving the sprocket-chain 76, which rotates large sprocket-wheel 75 on the shaft 74, carrying three beveled pinions 73, engaging the beveled wheels 72 on the vertical shafts 71, carrying the pinions 70, meshing with the large gear-wheels 69 on the screws or threaded rods 68, engaging the supporting beam or truss 79, from which the elevators depend, thereby raising or lowering said elevators, as may be desired. Motor 96 is also started, thereby imparting motion to the shaft 95, carrying the sprocket-wheel 94, chained to sprocket-wheel 92 on the shaft 91, carrying the small sprocket-wheels 90, chained to the sprocket-wheels 88 on the shafts of the driving-rollers 87 of the bucket-elevators 85, by means of which mechanism the elevators are caused to travel upwardly and to convey the material to be cleansed into the hoppers 115, communicating with the chute 56, which discharges into the washers 58, said washers being rotated by means of motor 28, Fig. 3, driving-shaft 25, carrying beveled pinion 55, meshing with the beveled wheel 54 on shaft 53, carrying pinion 52, meshing with the master wheels or rings 51 on the washers. The rotation of the shaft 95 by means of the motor 96 revolves the band wheel or pulley 97, belted by straight and twisted belts 98 and 99, respectively, to loose pulleys 100 and 101 on shaft 103, also carrying fast intermediate pulley 102, whereon said belts may alternately be shifted, as hereinbefore explained, to progress the elevators horizontally forward or backward across the front of the machine or apparatus and transversely of the filter bed, said pulley-carrying shaft 103 having sprocket-wheels 104, chained to similar wheels 106 on shaft 107, carrying beveled wheels 108, meshing with similar wheels 109 on the shaft 110, and gear-wheels meshing with a rack or bar 80 on the elevator support or truss 79, whereby the transverse travel of the elevators is secured. The centrifugal pump 60 withdraws the water from the conduit 58 and discharges the same into the rear of the washers 48 by means of a valve connection 63, Fig. 2, the surplus of used water passing from the washers 48 through the central opening 59 therein into a trough 64,

communicating with discharge-pipe 65, Fig. 1, which empties into a conduit or trough 59 on the other side of the filter-bed. The material cleansed in the washers 48 is discharged into the chute 57, which empties onto the inclined conveyers 14, discharging the cleansed material against the deflecting-plates 29 to distribute the same over the filter-bed; but if it is desired to convey the cleansed material beyond the filter-bed the direction of travel of the inclined conveyers is reversed, causing the same to discharge the cleansed material into the hoods 22, directing the material upon the main conveyor 12 discharging into the tripper 10, thereby effecting the final discharge of material at any point throughout the length of the main conveyor. After the material shall have been excavated from the filter-bed the motor 78 may be reversed and the elevators may be raised into the inoperative position illustrated in Fig. 4 of the drawings, in which position the machine or apparatus can then be transported from one filter-bed to another in the manner before described.

It is not desired to limit or confine this invention to the specific construction, combination, and arrangement of parts herein shown and described, and the right is reserved to make all such changes in and modifications of the same as come within the spirit and scope of the invention.

I claim—

1. A machine provided with a movable elevator, scraping means associated therewith, a cleansing device receiving the material raised by the elevator, means for conveying a fluid into and from said cleansing device, a conveyor receiving the cleansed material from said device and returning the same to the place from which the material was originally taken and means for operating the parts.

2. A machine provided with an elevator constructed to travel horizontally, scraping means associated therewith, a rotary cleaning device receiving the material raised by the elevator, means for conveying a fluid into and from said cleansing device, a conveyor taking the cleansed material from said device and returning the same to the place from which the material was originally taken and means for operating the parts.

3. A machine provided with an elevator constructed to travel back and forth, scraping means associated therewith, a cleaning device means for introducing thereinto the material raised by the elevator, means for conveying a fluid into and from said cleansing device, a conveyor taking the cleansed material from said device and returning the same to the place from which the material was originally taken and means for operating the parts.

4. A machine provided with an elevator

constructed to move horizontally and vertically, means for so moving said elevator, scraping means associated therewith, a washing device receiving the material from said elevator, means for conveying a fluid into and from said cleansing device, a conveyer taking the cleansed material from said device and returning the same to the place of deposit and means for operating said device and conveyer.

5. A machine provided with a traveling structure, an elevator supported therefrom constructed to travel horizontally and vertically, scraping means associated therewith, a cylindrical cleaning device receiving the material raised by said elevator, means for conveying a fluid into and from said cleansing device, a conveyer taking the cleansed material from said device, and returning the same to the place of deposit; and means for progressing said structure and for actuating said parts.

6. A machine provided with a traveling structure, a movable elevator supported therefrom, scraping means associated therewith, a cleaning device upon said structure receiving the material raised by said elevator, means for conveying a fluid into and from said cleansing device, a conveyer taking the cleansed material from the device and returning the same to the place from whence it came, means for progressing said structure and mechanism for operating said parts.

7. A machine provided with a traveling structure, an elevator supported therefrom, scraping means associated therewith, a rotary cleansing device receiving the material raised by said elevator, means for conveying a fluid into and from said cleansing device, means receiving the cleansed material from said device and returning the same to the place from whence it came and mechanism for progressing said structure and for operating said parts.

8. A machine provided with an elevator, scraping means associated therewith, a rotary cleansing device receiving the material raised by the elevator, means for conveying a fluid into and from said cleansing device, means receiving the cleansed material and returning the same to the place of deposit and mechanism for actuating the parts.

9. A machine provided with an elevator, scraping means associated therewith, an agitating device receiving the material from said elevator, means for conveying a fluid into and from said device, a conveyer taking the cleansed material from said device and returning the same to the place of deposit and mechanism for operating the parts.

10. A machine provided with an elevator, a shield to separate the cleansed from the impure material, means for cleansing the material raised by the elevator and for returning the same to the opposite side of said

shield from which it was taken and mechanism for operating the parts.

11. A machine provided with an elevator, a shield for separating the material, a rotary cleansing device receiving the material raised by the elevator, means for transporting the cleaned material, and means for distributing the cleansed material.

12. A machine provided with an elevator constructed to move horizontally and vertically, a shield movable vertically with said elevator and means for returning to the other side of said shield the material raised by said elevator and mechanism for actuating the parts.

13. A machine provided with an elevator, a cleaning device receiving material therefrom, a conveyer taking the cleaned material from said device, a main conveyer to transport the material discharged thereupon by said conveyer and mechanism for operating the parts.

14. A filter-bed provided with walls or inclosures, liquid-conduits, a traveling structure having a cleaning device, means for transporting the fluid from one of said conduits into said device and for transporting the fluid from said device into the other conduit and mechanism for actuating the parts.

15. A filter-bed provided with walls or inclosures containing liquid-conduits, a traveling structure carrying a cleansing device, means for carrying the fluid from one of said conduits into said device and therefrom into the other conduit, and means for operating the parts.

16. A filter-bed provided with walls or inclosures, liquid-conduits, a traveling structure carrying a cleansing device, means for raising material from the filter-bed to said cleansing device, means for carrying the fluid from one of said conduits into said cleansing device and for conveying the fluid from said cleansing device to the other conduit and means for operating the parts.

17. A filter-bed provided with walls or inclosures, liquid-conduits, a traveling structure carrying a cleansing device, means for raising material from the filter-bed to the cleansing device, means for depositing the cleansed material from the cleansing device onto the filter-bed, means for carrying the fluid from one of said conduits to said cleansing device, means for conveying the fluid from the cleansing device to the other conduit and means for operating the parts.

18. A filter-bed provided with walls or inclosures, liquid-conduits, a traveling structure supporting a cleaning device, mechanism for delivering material to said device, means for conveying the cleansed material from said device, devices for distributing the cleansed material over the filter-bed, instrumentalities for conveying the fluid from one conduit to said cleaning device and means

for conveying the fluid from said cleaning device to the other conduit and mechanism for actuating the parts.

19. A filter-bed provided with walls or inclosures, liquid-conduits, a traveling structure supporting a cleaning device, a device for separating the cleaned from the uncleaned material, means for delivering the uncleaned material to said cleaning device, mechanism for depositing the cleansed material upon the filter-bed, instrumentalities for conveying the fluid from one conduit to said cleaning device, means for conveying the fluid from said cleaning device to the other conduit and mechanism for actuating the parts.

20. A machine provided with means for scraping material from an exposed surface, means for elevating said material, an apparatus receiving the material elevated by said means, means in connection with said apparatus for cleansing said material, means for conveying fluid to and from said cleansing means, instrumentalities for returning the material so elevated and mechanism for actuating the parts.

21. A machine provided with means for scraping filtering material from an exposed

surface, means for elevating said material, means for transporting the material so elevated, a device for returning said material and mechanism for operating the parts.

22. A machine provided with means for scraping material from an exposed surface, means movable transversely of the machine constructed to elevate said material, a device for receiving the material elevated by said means and mechanism for imparting a transverse travel to said means.

23. A machine constructed to travel over the material operated upon, means constructed to travel back and forth in front of said machine and elevate the dry material, a device for receiving the material elevated by said means and mechanism for operating the parts.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles, State of California, this 21st day of October, 1903.

HIRAM W. BLAISDELL.

Witnesses:

MIGNON FORD.

R. E. BRINKER.