(No Model.)

F. T. GILBERT.

GRAVEL WASHER AND SEPARATOR.

No. 489,378. Patented Jan. 3, 1893.

Fig. 3.

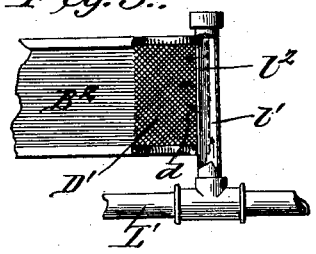


Fig. 1.

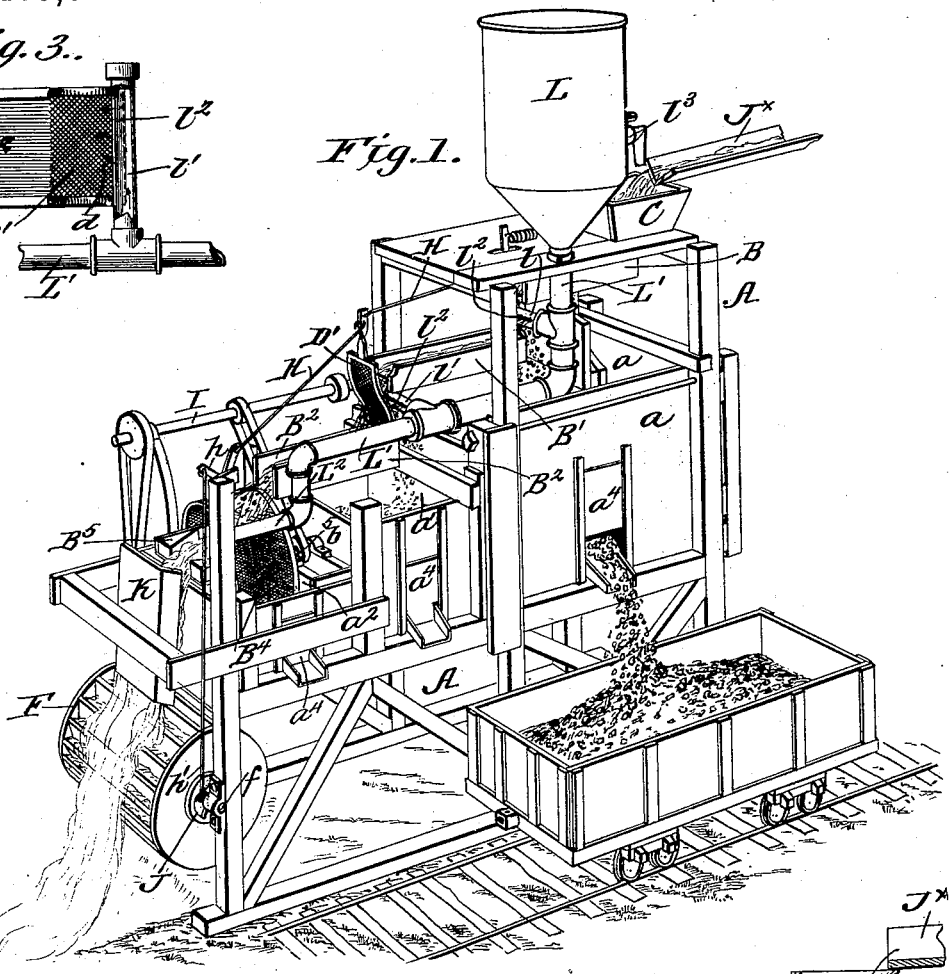


Fig. 4

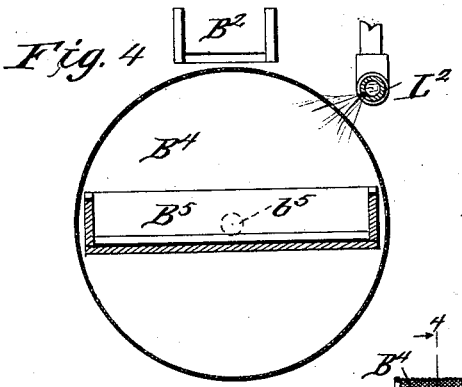
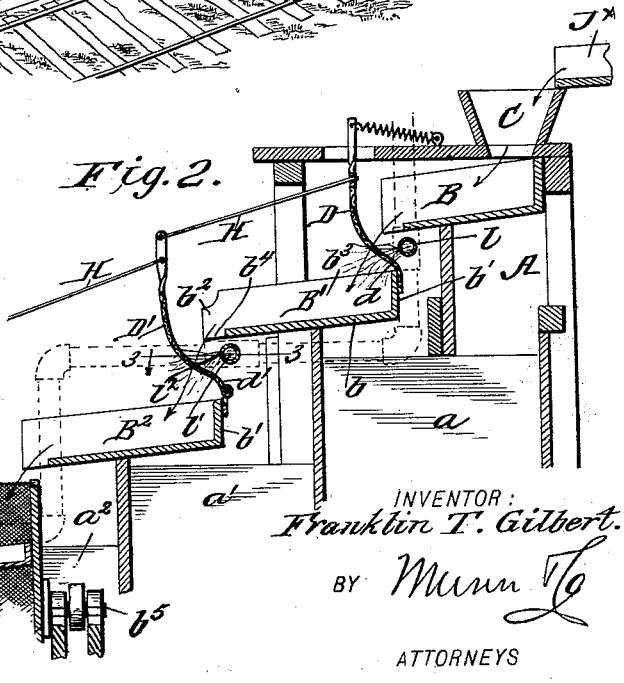


Fig. 2.



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GRAVEL WASHER AND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 489,378, dated January 3, 1893.

Application filed January 20, 1892. Serial No. 418,712. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN T. GILBERT, residing at Walla Walla, in the county of Walla Walla and State of Washington, have invented certain new and useful Improvements in Gravel Washers and Separators, of which the following is a specification.

My present invention which relates to gravel washers, refers more particularly to improvements on my patent No. 468,197, and it has for its object to provide a machine in which the mixed water and gravel is caused to pass through a series of screens of different mesh, whereby to separate the gravel from the water and the coarser from the finer grades.

It also has for its object to provide means for discharging a second and clear current of water that will give the material treated, both a flushing or second grading and washing treatment for each grade by itself, before it is finally discharged into the bins arranged to receive it.

To these ends my invention consists in the peculiar combination and novel arrangement of parts all of which hereinafter will be fully described in the specification and pointed out in the claims, reference being had to the accompanying drawings in which

Figure 1 is a perspective view of my improved gravel washer. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a detail horizontal section taken on the line 3—3, Fig. 2, and Fig. 4 is a cross section taken on the line 4—4 of Fig. 2. In the accompanying drawings, A, indicates a main frame which is formed with a series of bins $a\,a'\,a^2$, which are arranged to receive the different grades of gravel in the manner hereinafter described and such bins are provided each with a cut off slide a^4, whereby the contents thereof may be readily discharged into a car as shown in Fig. 1 in the drawings. The several bins are of different sizes, the rear one a being the largest to receive the coarser gravel, the center one a' the intermediate size of gravel and the front one a^2 the finer particles.

It will be noticed by reference to Fig. 2 that the upper ends of the bins are stepped to accommodate the several screening devices, the construction of which is most clearly shown in Fig. 2 and which consists of the troughs B B' B^2 the upper one B of which forms a receiving trough which leads the mixed water and gravel from the receiving hopper C into the first screening trough B' which is in the nature of a rectangular box having a closed bottom b, closed forward end b' and an open rear end b^2, bottom b ending however at a point in advance of the rear end of the side walls b^3 to form a discharge opening b^4 as clearly shown. The second trough B^2 has its forward or closed end extended over the bin a to a point under the end of the trough B, while the trough B^2 is similarly situated over the bin a' its open end being disposed over the bin a^2 and arranged to discharge such mixed water and gravel as may enter it from the trough B' onto a revolving screen B^4 presently described.

D indicates a separating screen hinged at its lower end to the upper edge of the closed end of the trough B', and D', a similar screen hinged to the closed end of the trough B^2, such screens being of a different mesh and extended up in front of the discharge ends of the troughs B and B' and connected with a shaker bar H, which is connected with a bell crank h which is intermittently operated by a pitman h' connected with and operated by the cam wheel J on the shaft f of the water wheel F which is journaled at the lower front end of the frame operated by the waste water which passes onto it from the troughs in a manner presently clearly set forth. It is manifest however that the water wheel can be dispensed with and the several screen operated devices operated by other suitable mechanical means.

By the construction so far as described it will be noticed that as the mixed clay, water and gravel passes down from the flume J into the hopper C it will enter the trough B and be discharged therefrom through the first screen D, which being of a large mesh serves to retard the coarser gravel and separate it from the finer gravel, which passes through such screen into the trough B' and from such trough it is carried to the screen D' which

serves to separate the intermediate size of gravel from the water, the finer particles then passing with the water through such screen into the trough B^2 from which they are discharged onto a rotary screen B^4, which being of a very fine mesh serves to effectually separate all of the remaining gravel from the water.

It should be stated that the object in using a rotary screen for separating the fine gravel from the water is, that from practical experience I have found that while the screens D D′ arranged as shown serve to separate the larger gravel when they are of a very fine mesh they soon become clogged and choked up and retard the ready discharge of the mixed clay, sand and water. The rotary screen however, owing to its large screening area and its rotary motion serves to throw off the gravel to one side and thereby prevents the possibility of choking the meshes thereof.

The screen B^4 is mounted on a shaft b^5 which is belted with a counter shaft I on the frame A, which in turn is belted or geared with the shaft f, of the water wheel F.

The screen B^4 has one of its ends open into which extends a chute B^5, which catches the water from the trough B^2 and leads it against a plate K which deflects it against the water wheel F in a manner clearly understood from Fig. 2 of the drawings. It will be also noticed that the rear ends of the troughs B′ B^2 extend a short distance under the discharge ends of the troughs B′ B respectively, and the screens D D′ are curved as at d d' and such curved portions extend under the openings b^4 of the troughs and serve to receive the gravel as it falls from the said troughs, thereby preventing the escape of any of the finer particles which might otherwise fall down in front of the screens.

Having thus described the first means for separating and washing the several grades of gravel I will now describe the means for a second treatment, by which a more thorough grading and cleaning of the material treated, is obtained before it falls into the several receiving bins.

L indicates a tank for holding clean water formed with a discharge pipe L′ which has laterals l l' projected in front of the screens D D′ at a point below the discharge openings b^4 of the troughs, such laterals having slits l^2 l^2 through which the clean water is discharged in a continuous sheet. The tank L is also formed with a branch L^2 slitted on its under face which projects over the rotary screen and discharges a sheet of water through such screen. By thus providing a source of clean water supply and arranging the laterals as described it will be noticed that as the several grades of gravel are separated they will pass through the sheet of clean water and be freed from any sand, dirt or foreign matter that may be in engagement therewith, and as the clear water is discharged through the screens in a continuous sheet, it also serves to drive the finer particles through the coarser screens and assists in keeping them clean.

When my improved screening machine is not used in connection with a gravel and water flume or sluice, water is supplied to the hopper C direct from the tank L, which is formed with a cock l^3 which extends into the said hopper, as clearly shown in the drawings.

Having thus described my invention, what I claim and desire to secure by Letters Patent—is—

1. In a gravel screening and separating machine, in combination, two or more troughs arranged to successively receive the mixed water and gravel, screens interposed between such troughs against which the mixed water and gravel is discharged, and a fresh water conductor, arranged to discharge a separate and unbroken water sheet against the said screens at a point below the feed of the mixed water and gravel whereby to intercept the separated or deflected gravel, and to assist in forcing the smaller particles through such screens substantially as and for the purpose described.

2. In a gravel screening and grading machine, in combination, a source of mixed water and gravel supply, a rotary screen arranged to receive the water and gravel on its outer face, and a fresh water conductor arranged and constructed to discharge an unbroken water sheet against such screen, and to intercept the separated material as it is deflected by the said screen substantially as shown and for the purpose described.

3. The combination, with the main frame, the troughs B, B′, B^2, each formed with a closed rear end and an open front end, said troughs having their front ends shortened as at b^4, the rear end of one trough being disposed under the discharge end of the preceding trough, of the screens D D′, hinged at their lower ends to the closed ends of the troughs and formed with curved portions d extended under the shortened ends b^4, and with upwardly extending portions projected over the discharge ends of the troughs and means for vibrating such screens substantially as and for the purpose described.

4. The combination, with the main frame, the hopper C, the troughs B, B′, B^2, the vibratory screens D′ D^2, the rotary screen B^4, the chute B^5, water wheel F and the intermediate devices for operating the screens D′ D^2, and B^4, connected with such screens and the water wheel F, of the water supply L, having a feed cock l^3, arranged to discharge into the hopper C and provided with a feed pipe L′, having slitted laterals l' l^2, all arranged substantially as shown and for the purposes described.

5. A gravel screening and grading machine comprising a source of mixed water and gravel supply, vibratory screens arranged to intercept and successively separate the gravel from the water, a rotary screen arranged to receive

the partially separated mixed water and gravel supply from the vibratory screens, a fresh water conductor or pipe, having slotted laterals projected and arranged to discharge an unbroken water sheet against the several screens and at a point to intercept the separated material as it is deflected from such screens, and means for imparting the proper motions to the vibratory and rotary screens all as and for the purposes set forth.

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