

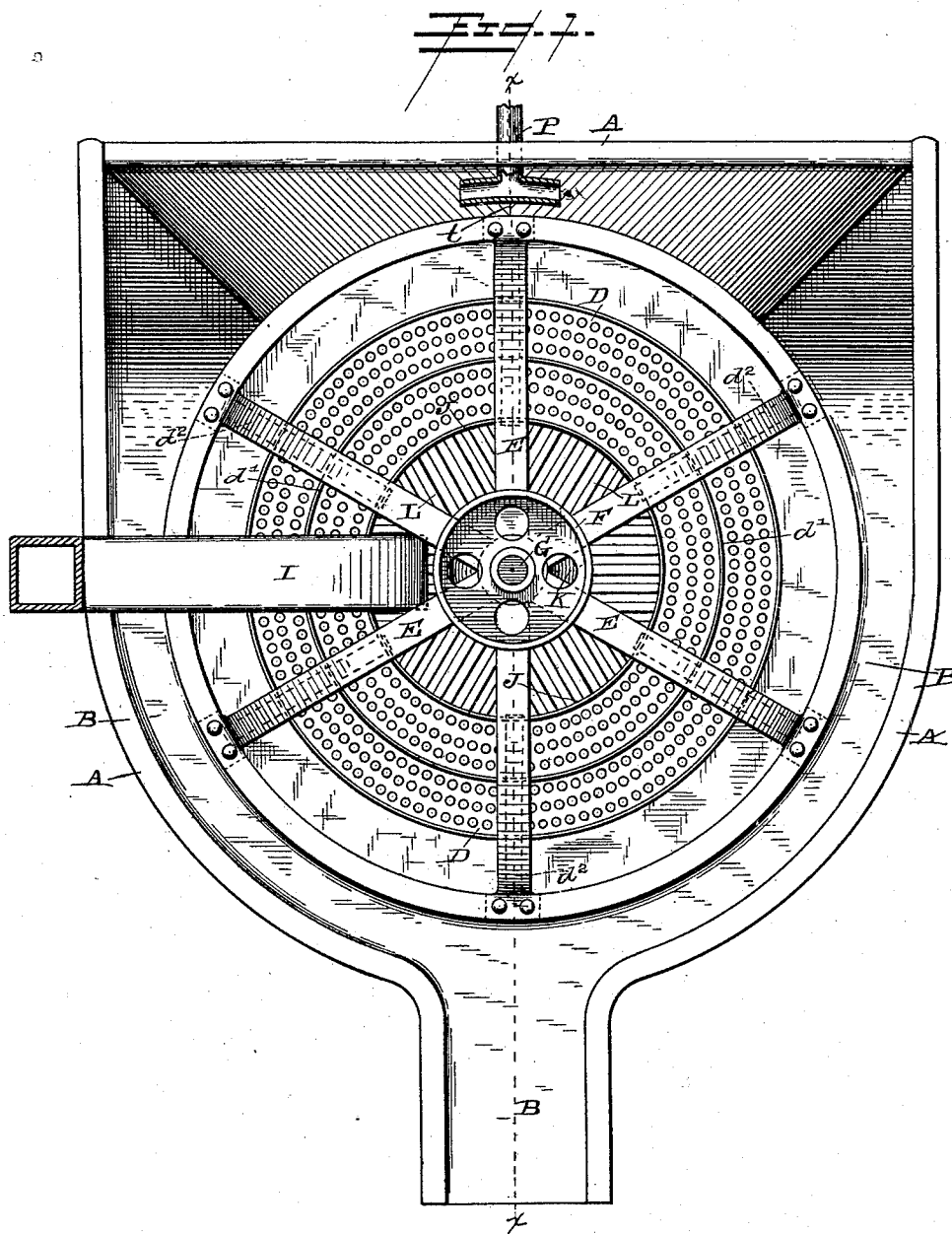
(No Model.)

4 Sheets—Sheet 1.

F. J. HOYT.
GRAVEL SCREEN.

No. 474,662.

Patented May 10, 1892.



Witnesses

John Blackwood
W. B. Blackwood

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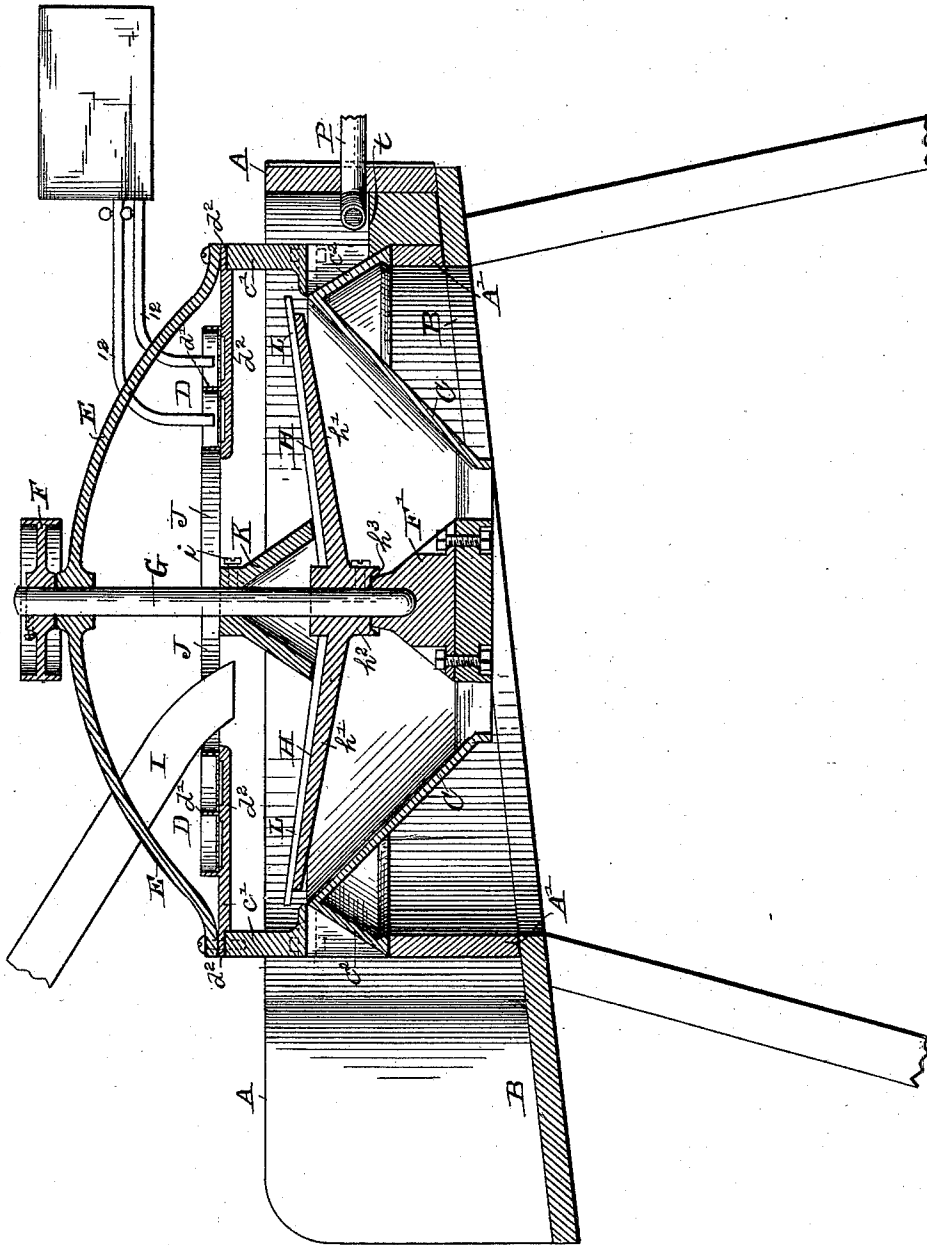
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4 Sheets—Sheet 2.

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(No Model.)

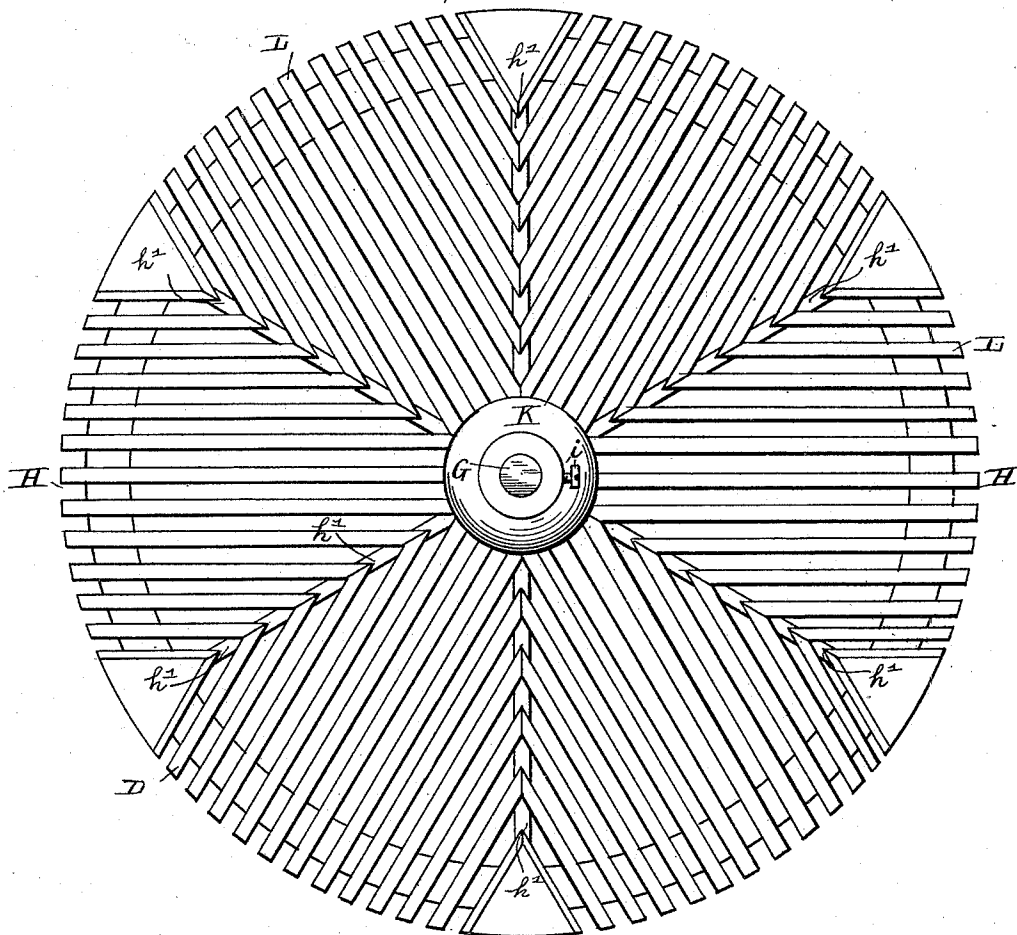
F. J. HOYT.
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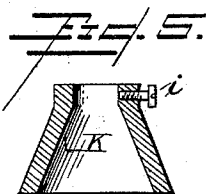
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~~Fig. 3.~~



~~Fig. 4.~~



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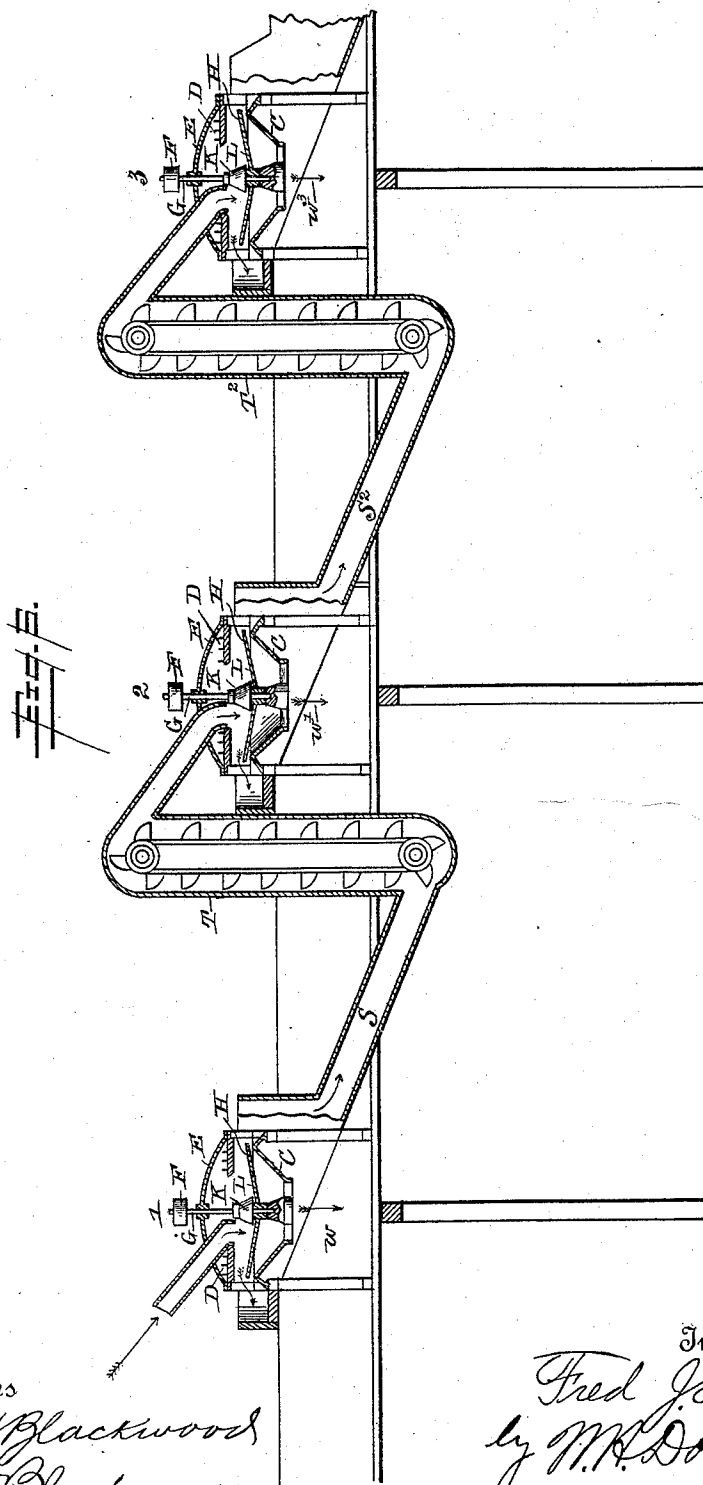
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UNITED STATES PATENT OFFICE.

FRED J. HOYT, OF CHICAGO, ILLINOIS.

GRAVEL-SCREEN.

SPECIFICATION forming part of Letters Patent No. 474,662, dated May 10, 1892.

Application filed July 15, 1891. Serial No. 399,634. (No model.)

To all whom it may concern:

Be it known that I, FRED J. HOYT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Gravel-Screens; 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 ap-
10 pertains to make and use the same.

My invention relates to gravel-screens; and it consists of the means, as hereinafter described and claimed, whereby the gravel in its rough state is first cleaned and then by
15 successive operations screened and divided into different grades.

In the industrial arts wherever gravel is employed in the making of concrete, in roofing and paving compositions, &c., it is highly necessary that the gravel should be, if possible,
20 absolutely clean and that it should be of a uniform size for each particular purpose. The general known classes into which gravel is divided are the rough, which comprises the largest of all sizes before grading, the roofing,
25 which is a medium size, and the torpedo, which is the finest. These general sizes may also be subdivided and assorted. To thus cleanse the gravel and screen and subdivide it at one operation, as it were—that is by a method which,
30 taking the gravel from the pit, will at one point and by one set of machinery thoroughly clean, then screen, grade, and separately deposit the several grades of gravel—is the object of my
35 improvements.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view; Fig. 2, a transverse sectional view on line *xx* of Fig. 1; Fig. 3, a plan of the improved screen employed; Fig. 4, a detail showing the shape of the rods forming the screen; Fig. 5, a detail of a detachable deflector to be placed on the screen-shaft to
40 deflect the gravel from the center of the screen; and Fig. 6, a side elevation, partly in section, of a set of machines arranged to illustrate my method.

The apparatus employed consists generally of an outer rectangular or other shaped frame
50 A, made of wood or other suitable material, mounted on supports and having a central

circular open wall or casing A', with an inclined trough B, divided and running on both sides of the wall A', a metallic cylindrical funnel-shaped casing C, seated on and secured
55 to the top of the central wall A', a circular sieve-like washer D, secured to a spider frame E, which is bolted to the tops of legs *c'*, rising from casing C, a vertical rotary shaft G, having its upper end extending through and supported by a union of the spider frame E and
60 carrying at that end a band-wheel F, its lower end turning in a cone-shaped bearing F' at the center of and connected to the lower casing C, said shaft carrying between the washer
65 D and casing C a screen H, formed of longitudinal bars, as hereinafter described, and adapted by movement of the shaft to throw by centrifugal action the material thereon
70 onto the surrounding trough B in the outer casing A after the same has been cleaned by water from the washer D.

Referring more particularly to the various parts of this apparatus and their operation, the gravel, just as taken from the bank or pit,
75 is introduced into the apparatus by a hopper I, which conducts it through a circular space J in the water-screen surrounding the rotary shaft and onto a deflector K, secured to the shaft. This deflector is detachable, being
80 secured by a set-screw *i*, passing through its rim, against the shaft. The function of the deflector is to throw the material to be screened a short distance away from the shaft onto the screen, so as to overcome the inertia of the
85 mass, which would otherwise obtain in a great measure at the center of the centrifugal screen and to thus obtain at once for the material a high initial velocity. The deflector
90 may not be secured to the shaft, but may rest on the screen.

The screen H is composed of bars L, (illustrated in Fig. 4,) the upper surface of which is flat and side and under surfaces curved. By the use of bars of this form instead of perforated
95 screens or screens made of entirely round bars the gravel or similar material, which may be of all sizes and shapes, is prevented from lodging and clogging the screen. With this form of screen the gravel will fall directly
100 through between the bars or be carried directly off, whereas by perforations or other

formed screens the gravel may fall partly through and then be held from further escape by the surrounding walls.

The washer is made in the form of a sieve in order that the water may be distributed over the entire material to be washed. It is divided into separate compartments by partitions d' , secured to arms d^2 , extending from the encircling rim or flange of the sieve, and the object of these divisions is to regulate the amount of water to be used and control its application. It may be found that the water need only be used at the inner portion of the screen or at the outer portion, or if the gravel is much mixed with dirt it then may be necessary to flood the entire screen. For this purpose each compartment is provided with an inlet-pipe i^2 , leading from a convenient tank and governed by a suitable cock or valve.

The gravel-screen is divided into triangular-shaped sections by arms h' , each section containing its set of longitudinal bars of different length, and the supporting-arms h' , converging to and connected with the hub h^2 , which is secured to the rotary shaft G by means of a set-screw. The hub h^2 is provided with a dependent flange h^3 , which answers as a sand and dirt guard for the conical base F', in which the lower end of the shaft bears.

The material carried through the screen H, either falling directly down through the apparatus through a central opening at the bottom or directed therethrough by the inclined walls of the casing C, is deposited on the ground or in any proper receptacle, as desired. The coarser gravel or other material carried over the edge of the revolving screen H falls directly into the surrounding inclined divided trough B or is guided thereto by the outwardly-inclined walls c^2 of the casing C and is there met with a stream of water flowing into the divided trough from its highest point t from a two-way pipe P, leading from any suitable water-supply. These streams of water not only force the gravel out of the trough, but still further clean it. The gravel falling from the trough is caught in any suitable receptacle.

By use of one of my machines only one part of my invention is accomplished, the whole of which contemplates the use of several machines. In Fig. 6 my method is illustrated by the employment of a series of these machines. Into apparatus marked 1 all the gravel, with its accompanying sand and adhering dirt, is conducted by a suitable hopper and in which the gravel-screen is of such fine mesh as to permit the escape therethrough of only the dirt and sand washed from the water-sieve and which falls through the machine, as indicated by arrow w , while all the gravel is carried into the surrounding trough and forced off the same by the water into an inclined chute S, at the foot of which it comes in contact with a bucket-elevator T, which

lifts the water and gravel into apparatus No. 2. No. 2 is provided with a gravel-screen of a little coarser mesh, which will screen the finest or torpedo grade of gravel and deposit it under the machine, as indicated by arrow w' . The other grades are thrown into the surrounding-trough, carried to machine No. 3, (by conduit S² and elevator T².) provided with a still coarser screen, and the next second coarser or roofing-grade is produced and deposited at w^3 , and the still coarser or third grade is thrown off the trough. If sufficiently separated, the last coarse gravel may be deposited from the trough into suitable receptacles or the gravel may be again subdivided into as many sized grades as desired.

What I claim is—

1. A series of connected gravel cleaning and screening machines, each machine composed of an outside stationary casing, an inside horizontal water-sieve secured to said casing, a vertical rotary shaft carrying a screen composed of bars, a divided inclined trough around and outside of said screen, a divided water-pipe conducting water both ways into said trough, a hopper conducting the gravel through an opening in said sieve, and a deflector on the shaft against which the gravel is thrown and deflected toward the periphery of the screen, in combination with a conduit leading from the said trough, a hoisting apparatus connecting said conduit with the next machine, and each machine successively provided with a gravel-screen of coarser mesh, substantially as and for the purpose described.

2. The combination, with a vertical rotary shaft and gravel-screen secured thereto, of the stationary water-sieve placed above said screen and provided with circular partitions to form compartments and an independent water-supply pipe for each of said compartments, substantially as described.

3. The combination, with a rotary shaft, of a screen composed of bars of different lengths and arranged in sections and having their upper surfaces flat and sides and bottoms curved, and supporting-arms for said sections converging to and connected with a hub, with which said shaft is provided, substantially as described.

4. In a gravel cleaning and screening machine, in combination with an outside casing and a vertical rotary shaft, an inside horizontal stationary water-sieve secured to said casing, a rotary screen secured to said shaft below said washer, a rotary deflector between the water-sieve and screen, and an inclined conduit extending through an opening in said water-sieve to said deflector for conducting the gravel through said stationary sieve onto said deflector and screen, substantially as described.

5. The combination, with the funnel-shaped bottom casing, of the vertical rotary shaft having a bearing in a central hub of said casing, a water-sieve secured to supports rising from said bottom casing, and a spider frame, in

which said sieve is supported, said spider frame affording a bearing for the upper portion of the said shaft, substantially as and for the purpose described.

5 6. The water-sieve and its supporting spider frame, in combination with the vertical rotary shaft and the gravel-screen carried by said shaft, said sieve cut away to form an open space about the said shaft for the conduct of

gravel through said washer onto said screen, so substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRED J. HOYT.

Witnesses:

JOS. H. BLACKWOOD,
W. H. DOOLITTLE.