No. 612,706. Patented Oct. 18, 1898.

S. CROW.

COMBINATION DREDGE FOR MINING FOR AND SAVING GOLD, TIN, AND OTHER METALS.

(Application filed Aug. 4, 1897.)

(No Model.)

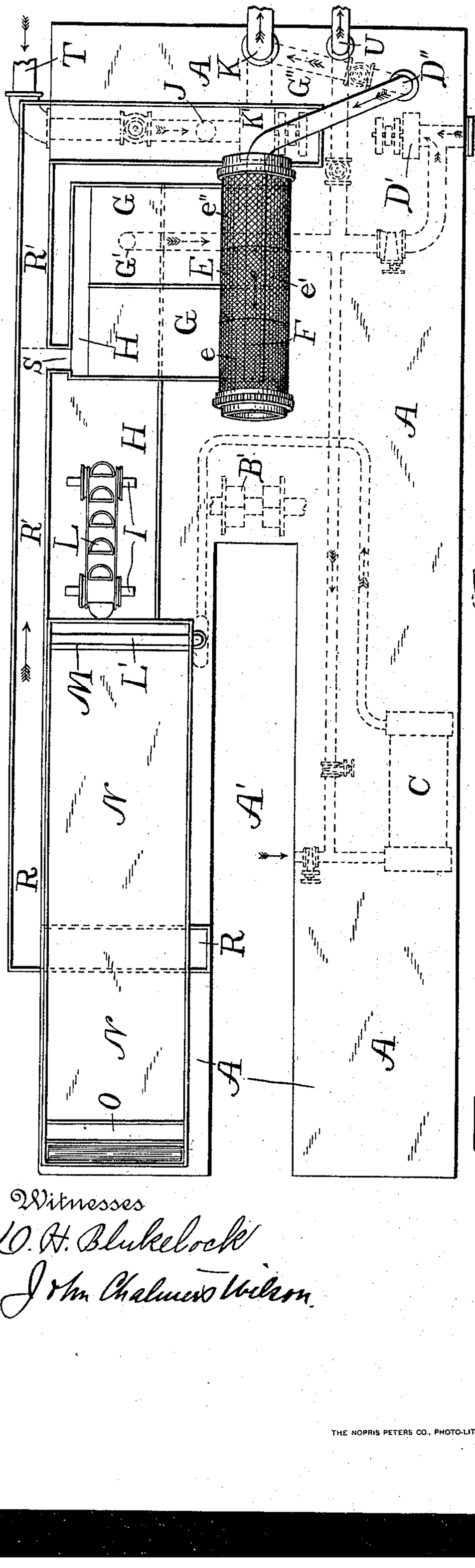

FIG. 1.

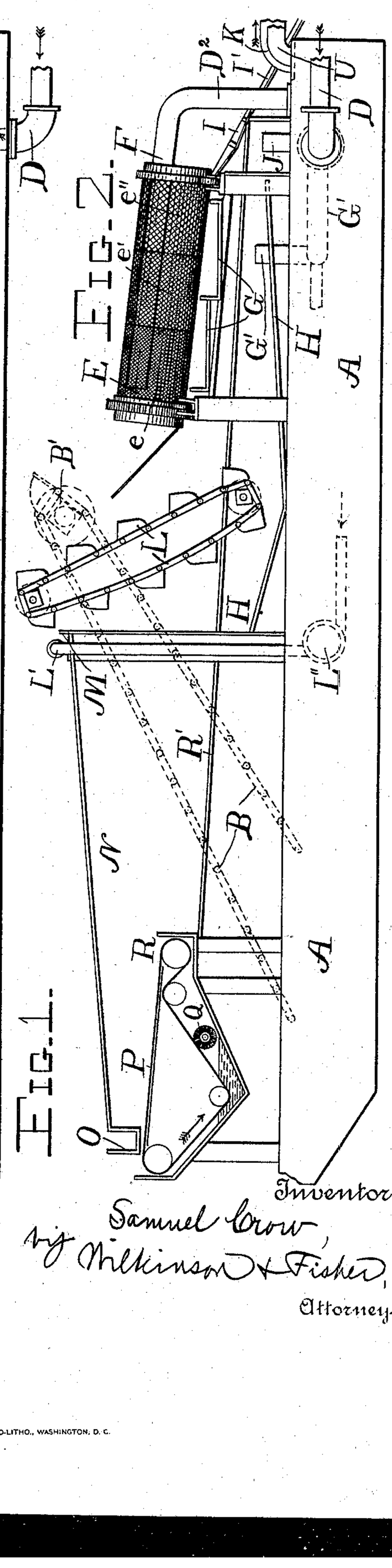

FIG. 2.

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UNITED STATES PATENT OFFICE.

SAMUEL CROW, OF DUNEDIN, NEW ZEALAND.

COMBINATION-DREDGE FOR MINING FOR AND SAVING GOLD, TIN, OR OTHER METALS.

SPECIFICATION forming part of Letters Patent No. 612,706, dated October 18, 1898.

Application filed August 4, 1897. Serial No. 647,091. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL CROW, an accountant, a subject of the Queen of Great Britain, residing at 31 Moray Place, in the city of Dunedin, in the British Colony of New Zealand, have invented a new and useful Combination-Dredge for Mining for and Saving Gold, Tin, or other Metals, of which the following is a specification.

The object of this invention is to mine and treat an alluvial paddock and to clean up the bottom of same in order to obtain the gold, tin, or other metals in the wash-dirt, crevices, and bottom.

A dredge is made in the usual way for bucket-dredging and is also provided with sand-pumps. When dredging with buckets, the largest of these pumps is used for elevating the tailings and the rest for lifting the water or wash-dirt.

The following is a general description of the manner in which I effect my working:

A paddock is dredged to as near the bottom as possible, and part or a space beyond the paddock is cut to a sufficient depth and size to contain the dredge when the paddock is pumped out, so that the dredge is retained at a higher level than the bottom of the paddock.

During the dredging of the paddock the tailings-pipe will sometimes have to be of a great length to clear the edges of the paddock. This pipe will either be supported on pontoons or by means of jib-cranes or the like.

Dams may have to be formed when in or near a body of water to allow of the subsequent draining of the paddock. When the paddock is drained or pumped out, it is sluiced by nozzles with water supplied from a well in the dredge or other available source to the suction of one of the sand-pumps, which discharges the wash-dirt thus obtained into a perforated revolving screen furnished with holes of graded size, the smaller holes being at the upper end of the screen. When the buckets are being used for lifting, the wash-dirt is delivered into this same screen. The wash-dirt so delivered into the upper end of the screen is separated thus: The portions too coarse for passing through any of the holes in the screen pass over a coarse grid, and then the very coarse pieces go overboard and the rest drop into a box, while the graded portion which has passed through the holes in the screen spreads over saving-tables, preferably covered with ripples of expanded metal, and then drops into a well. This wash-dirt is then elevated into a distributing-box, where it is again spread over tables and return-tables to save deck-space. Any of the tables may be provided with self-cleansing traveling mattings, so as to present a cleansed surface to the descending wash-dirt. From these tables the wash-dirt passes to the tail-race, which leads it past the well at the foot of the first tables under the screen, so that when desired the wash-dirt can be turned again into this well, and the saving process can thus be repeated, or else the wash-dirt is allowed to pass to the tailings pump or elevator.

Water for washing down the tables is drawn in by one of the pumps arranged for this work, and a branch from the pump suction-pipe drains the well when required, or the well may be allowed to overflow to the tailings-pump, which is obviously the largest one.

When the bottom of the pumped-out paddock is being cleaned up, the buckets are not in use, and as the dredge may then for convenience sake have been grounded the usual place of inflow for circulating water to cool the condenser would be ineffective, and so to furnish this water a connection may be taken from the well inside the dredge.

Any of the boxes, tables, or tail-race may be furnished with such suitable saving appliances as are usually used.

Referring to the accompanying drawings, Figure 1 is a plan of a dredge with the apparatus as arranged for my manner of working. Fig. 2 is a part elevation and part section of same with the sides of the tables and boxes removed to show same better.

A A is the punt or hull of any dredge, and A′ is the bucket-well for the line of buckets to work in for dredging.

B is the position of the usual line of dredging-buckets in a bucket-dredge, and B′ is the main upper tumbler.

C is any condenser as used for compound engines and is shown merely to illustrate the arrangements for the water circulation under the conditions in which the dredge may be.

D is the main intake or suction pipe of the wash-dirt and water pump D′. The discharge is usually through the pipe D″ to the pipe F in the cylinder E. The pipe F is perforated with fine holes in that part which is inside the cylinder E and is used when water is pumped by D′ for washing the wash-dirt brought by the buckets B when they are working; but it is changed for a plain pipe (also F) simply discharging from the upper end when the pump D′ is delivering wash-dirt and water and the buckets B are thrown out of gear.

E is a revolving perforated screen usually running on small rollers, as shown, and set at an angle for free delivery, at the lower end, of the wash-dirt that cannot be screened. This screen is slowly revolved, usually by tooth-wheels, as shown. The supporting-wheels may, however, be larger and flanged, as railway-wheels, and the power can then be applied to some of these wheels to cause the cylinder to revolve slowly, the flanges merely preventing the tendency of the screen to slide down during its revolutions. This cylinder is perforated with graded holes between the roller-paths, the smallest perforations being at *e*, the holes becoming larger in the direction of *e′* and being largest at *e″*.

In working whether the wash-dirt is delivered by the buckets B, in which case the water for washing same is delivered by the pump D′ into the perforated pipe F and through the perforations of that pipe, or whether when cleaning up the paddock by sluicing to the pump D′, when both wash-dirt and water are delivered at the top of the plain pipe F by the pump D′, the wash-dirt is screened through the graded holes in the screen E, and the combined wash-dirt and water for washing pass together over the tables G to the well H H. Any wash-dirt too coarse to go through the screen-holes passes over the bar-grid I, which separates it, so that the finer wash-dirt drops into the box J, the coarser sliding overboard on the plate I′, thus avoiding the choking of the pump K′. As the well H H would soon be full of wash-dirt and especially of water, the surplus water may be drawn off by the pipe G′. The amount so drawn off can be regulated by a stop-cock in the pipe G′. Should it be found desirable, the whole of the water can be sent over the tables through the pump D′ by way of the screen E, or part or all may be allowed to escape through the opening S to the tail-race R′ and so to the tailings-discharge pump K′ by the pipe K. The wash-dirt in the well H H gravitates to the foot of the elevator L, which takes it to the distributing-box M, together with the small quantity of water which may have been lifted by the buckets. This wash-dirt is washed by water which has been drawn through the condenser either from the bucket-well A′ or from the well H, if the supply from A′ fails, by the pump L″ and is supplied through the perforations of the pipe L′. The wash-dirt then passes over the saving-tables N, and it will be seen that in this operation the desired quantity of water can be used and there is no compulsion to use the larger quantity of water that is required for screening, which larger quantity would tend to prevent the lodgment and saving of the gold, tin, or other metals. From N the wash-dirt passes to the box O and to the under tables P, on which the matting slowly travels in a direction contrary to the flow of the wash-dirt. This matting is constructed as an endless band having the lower part moving in a trough of water, where it can be brushed by a revolving brush Q to remove the concentrates collected on the matting, thus enabling the matting to present a cleansed surface to the wash-dirt coming from the box O. Passing through the box R to the tail-race R′ the wash-dirt can, if desired, at any time be directed through the opening or by-wash S, and thus returned to the well H to be re-treated over the tables N and P. Otherwise the wash-dirt passes to J, where it is pumped by the pump K′ to the tailings through the pipe K. When it is desired to repass any of the wash-dirt through any of the processes, the dredging can be stopped, or partly so, by the buckets or pumps being stopped or slowed.

When the dredge is used as a bucket-dredge to cut the paddock out, the pumps D′ and K′ are used. The pump L″ is used when the engines are running; but if the water is not required to pass over the table N it can be turned overboard by any branch. (Not shown.)

If at any time it is found that the buckets cannot reach low enough in the paddock then being worked, a suitable depth can be obtained by reducing the inflow of water to the paddock. Then the discharge-pump from K will reduce the water and give the depth required. The part dredged outside and adjoining the paddock on which the dredge is to be floated to and secured must only be of sufficient height above the bottom to allow the pumps to work effectively. For the purpose of pumping the paddock after excavation by the dredge all the pumps can be used. The water pumped by the pump D′ will be turned into K by opening the valve in the pipe G″, the pump K′ will draw through the branch T on opening the valve in branch T and placing a blind flange on the end of the pipe in the box J, and the pump L″ will draw through the branch U, generally used for sluicing, by closing the valve in the pipe G′ and also closing the end of the pipe that is under the tables G by a blind flange. The pipes D, K, and T may be swiveled in any direction to suit circumstances. In subsequently cleaning the bottom the well H is supplied with water, T is stopped, and for sluicing water is allowed to fall by gravitation from U. Wash-dirt is drawn in at D, passing to the screen and other saving processes as described, the tailings passing away at K.

In this invention any suitable materials, sizes, or grades may be adopted.

What I claim as my invention, and desire to obtain by Letters Patent of the United States, is—

1. In a combined dredge and ore-concentrator, the combination of a boat, means for elevating the material operated upon supported on said boat, a graded screen into which said dredge discharges, a water-pipe discharging into said screen, separating-tables located underneath said screen, a well into which said tables discharge, an elevator in said well, a separating-table upon which said elevator discharges, an endless apron provided with matting upon which said table discharges and discharge-troughs whereby the tailings may be delivered either to the tailings-pump or to the well, substantially as described.

2. In a combined dredge and ore-concentrator, the combination of a boat, a dredge supported on said boat, a graded screen into which said dredge discharges, a water-pipe discharging into said screen, separating-tables underneath said screen, a well into which said tables discharge, means for removing the surplus water from said well, an elevator in said well, a separating-table into which said elevator discharges, an endless apron provided with matting upon which said table discharges, a revolving brush for cleaning said matting, and discharge-troughs, whereby the tailings may be led directly to the tailings-pump or back to the well for retreatment, substantially as described.

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Witnesses:

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