W. W. BONSON.

PROCESS FOR DRY ORE SEPARATION.

APPLICATION FILED JULY 26, 1909.

980,890. Patented Jan. 3, 1911.

2 SHEETS—SHEET 1.

Fig 1

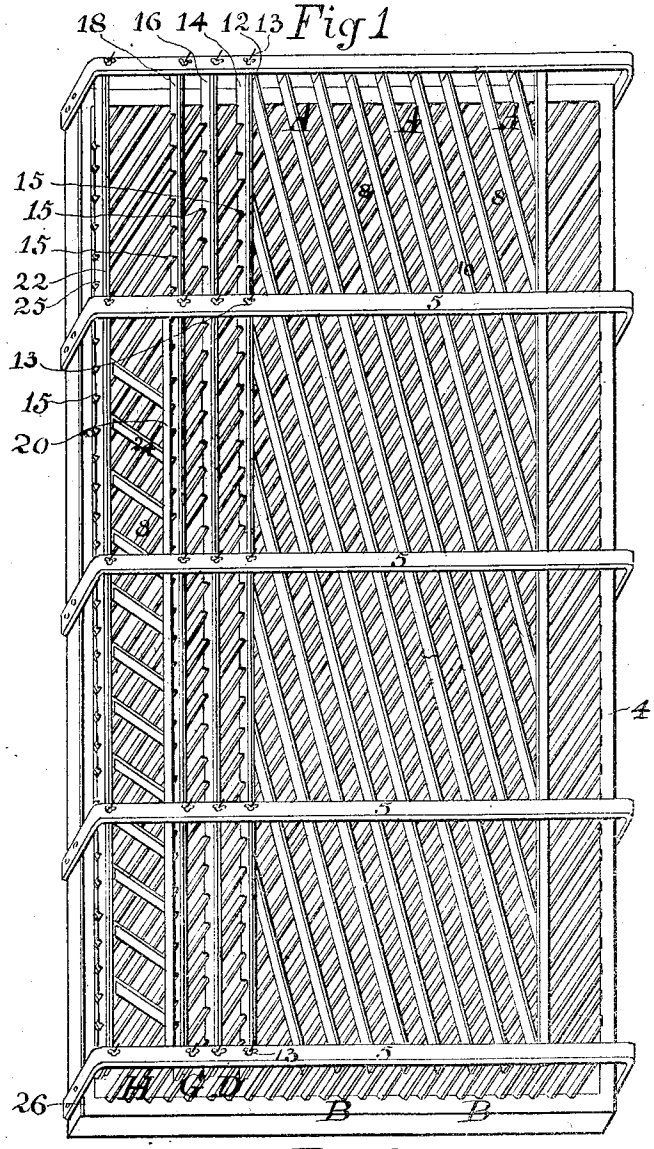

Fig 2

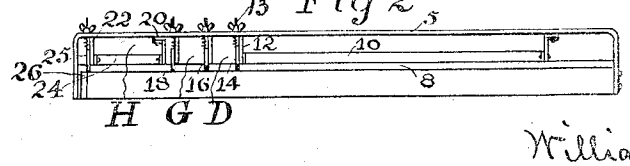

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Fig 3

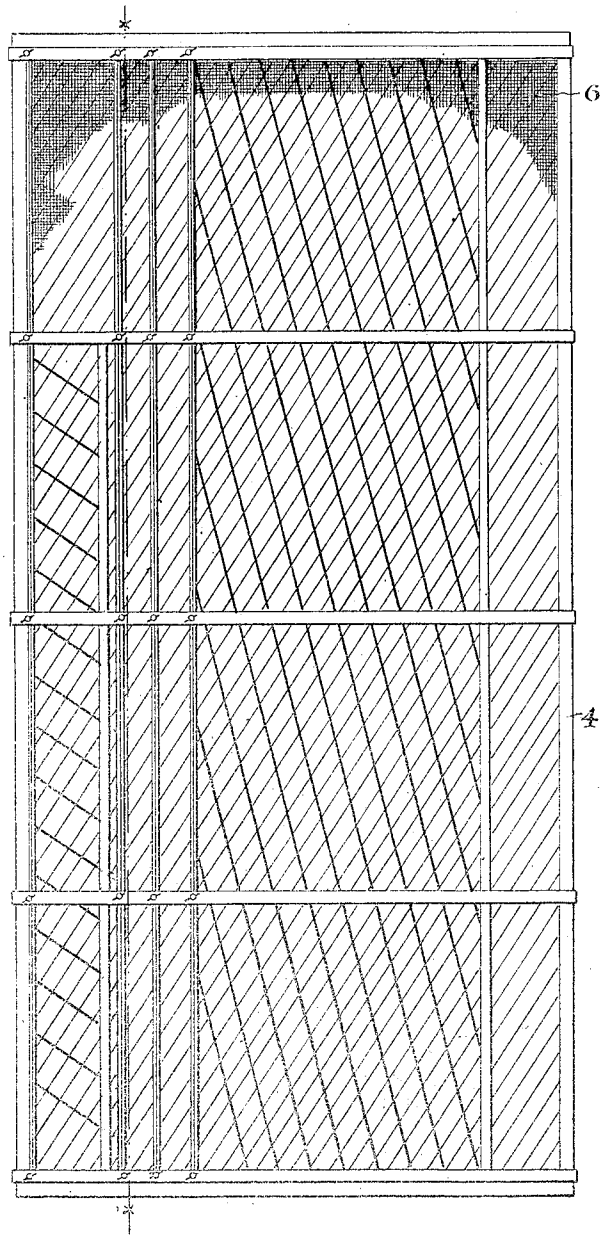
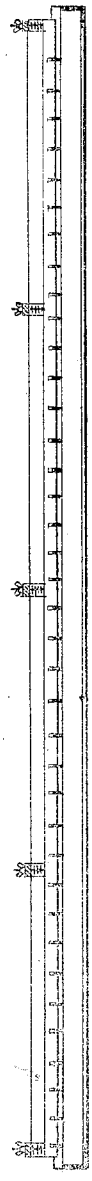


Fig 4



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UNITED STATES PATENT OFFICE.

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PROCESS FOR DRY ORE SEPARATION.

980,890. Specification of Letters Patent. Patented Jan. 3, 1911.

Application filed July 26, 1909. Serial No. 509,521.

To all whom it may concern:

Be it known that I, WILLIAM W. BONSON, citizen of the United States, residing at Dubuque, in the county of Dubuque and State of Iowa, have invented certain new and useful Improvements in Processes for Dry Ore Separation, of which the following is a specification.

My invention relates to the process of ore separation with special reference to the process of surfaced dried ore separation of masses having different and varying percentages of ore.

This process consists in delivering the mass to be separated upon a moving surface with a pressure of air therethrough, then forming a bed of ore, then continuously maintaining this bed of ore, while the varying percentage of ore in the mass is being continuously delivered onto this bed and drawn off from the bottom as set forth in the claims.

In the accompanying drawings I have shown a simple and convenient device for illustrating and carrying out my process, but I do not wish to confine myself to this particular structure as it is manifest that numerous structures might be used to assist in accomplishing the ends desired.

Figure 1 is a perspective view of a table or moving surface. Fig. 2 is an end view of Fig. 1. Fig. 3 is a plan view of Fig. 1. Fig. 4 is a side view of one of the gates and the rail against which it slides.

Referring to the drawings, Fig. 2 designates a moving surface or table upon which the mass to be concentrated is delivered along across a portion of the upper end. This table is surrounded by a frame 4 and across and upon the table are secured to the frame at intervals, arches 5, to which are fastened gates hereinafter to be described. This table is also covered with a mesh 6 and upon the mesh are rigidly secured, at an angle to the length of the bed, deflectors, 8, and over these deflectors are fastened, at an angle to the lower deflectors, other similar deflectors, 10 which preferably extend only to the first gate. On one side of the longitudinal center of the table is secured to the arches, 5, a rail or plate, 12, and against this rail is a gate, 14, adjustably attached by screws, 13, to the arches, 5, but adapted to be moved in contact with the rail, 12. This gate is provided with slots, 15, in which slots the lower deflectors, 8, engage whenever the gate is raised or lowered. Parallel with the gate, 14, are similarly secured, other gates, 16 and 18. There may be only the gate 14, but I prefer to have a plurality of these gates and here show three. A short distance beyond the last gate, 18, is fastened to the arches, a rail, 20, which runs parallel with the gates and at the outer edge of the frame is also secured to the arches a rail, 22. These rails, 20 and 22, are connected together by deflectors, 24, that just come in contact with the upper surface of the lower deflectors, 8. Between the gate 14, and the rail 20, there is no special necessity for upper deflectors 10. Against the outer rail, 22, is adjustably secured to the arches, 5, by screws, 13, a gate, 25, similar to the other gates and adapted to be adjusted down to the mesh on the table. Along parallel with this gate 25 is a chute 26, on which the concentrates are delivered and carried off. This table is adapted to be reciprocated longitudinally and air is forced up through the mesh, but as the moving of the table and the manner of forcing the air through the mass is no part of my invention, the construction of these are not described.

The mode of carrying out my process is substantially as follows:—The mass to be separated is first surfaced dried, and is then delivered all along the head of the table at A up to the first gate 14. The operator then adjusts the gate 14 by the screw 13, so that it stands almost at the top of the deflectors 8. The next gate is adjusted a little lower and the third gate nearly to the mesh. As the mass is delivered upon the moving table at A and sufficient air is being forced up through the mesh and moving mass, the gangue or lighter material will be suspended and the ore or heavier material will remain on the mesh. Since the table is slightly inclined and is reciprocated, a large portion of the gangue will pass over the top of the lower deflectors between the upper deflectors and be carried down to the end of the table and dumped at B, but all of the ore and some of the gangue will be carried underneath the gate 14, and as the mass travels along between the deflectors and gates 14 and 16, part of the gangue will be taken off and delivered at D, but the ore and some of the gangue still remaining will pass under the next gate 16, and as they travel between the gates 16 and 18 some more of the gangue

will pass off and be delivered at G. Since the gate 18 is nearly down to the mesh, only the ore and a small amount of the gangue will be delivered beneath this gate 18 into the space between the rails 20 and 22. The operator then closes down the gate 25, which prevents all the ore and the remainder of the gangue from passing out into the chute 26. Between the two rails 20 and 22, the ore will be delivered and there form a bed of ore, and when this bed of ore has approached the desired thickness, the gate 25 is slightly raised allowing the clear ore from the base of the bed to pass out into the chute 26, then the operator watches and sees how much ore and what percentage of ore is being delivered upon the bed from the mass and adjusts the gate 25 so that substantially the same amount of ore will be drawn off from the bottom of the bed as is delivered to the bed from beneath the gate 18, and the gangue and middlings with the other wastes will be carried off at the foot of the bed between the rails 20 and 22 at H.

It will be seen by this process that there is always maintained a bed of ore of substantially the same thickness at all times whatever the percentage of ore there may be in the mass and the pure ore or whatever the concentrates are, being heavier will always be found on the bottom of the bed from which they are automatically drawn as fast as the ore is delivered to the bed.

Having now described my process what I claim and desire to secure by Letters Patent is:—

1. The process of separating ore, which consists in delivering the mass to be separated upon a moving surface provided with a mesh, then forcing a constant current of air through the mesh and mass, then forcing a portion of the gangue from off the ore while the mass is on one part of the moving surface, then forming an independent ore concentrating bed on another part of the moving surface, and then continuously delivering the partially separated mass from the first part of the surface to the ore concentrating bed and continuously drawing off the concentrated ore from the under surface of the bed.

2. The process of separating ore, which consists in delivering the mass to be separated upon a moving surface, then forcing air upward through the moving mass and stratifying the mass, then skimming or removing part of the gangue from off the mass, then forming an ore concentrating bed, then removing the stratified gangue from the upper surface of the concentrating bed, and drawing off the pure ore from the lower surface of the bed.

3. The process of separating ore which consists in delivering the mass to be separated upon a moving surface formed into two divisions and provided with a mesh, forcing a current of air through the mass, forcing a portion of the gangue from off the ore on one division of the table, then arresting the advancing movement of the ore for forming an ore concentrating bed on the other division of the table, forcing the gangue and middlings from off the ore on the ore bed and then removing the ore from the lower surface of the concentrating bed.

4. The process of separating ore, which consists in delivering the mass to be separated upon a moving surface, forcing air therethrough, then removing a portion of the gangue from the mass while the mass is traveling on one division of the moving surface at a given rate of speed, then dividing the mass into two divisions on the surface, then delivering the partly separated mass upon the other division of the table where it is caused to travel at a slower rate of speed thereby forming an ore concentrating bed on that division where the mass is moving slower, then continuously delivering upon the bed the partially separated mass and continuously drawing off the pure ore from the lower surface of the bed.

5. The process of separating ore, which consists in delivering the mass to be separated upon a moving surface formed into two divisions and provided with a mesh, forcing the air therethrough, forcibly removing the lighter portion of the gangue from off the ore on one division of the table, skimming off part of the gangue as it is delivered onto the other division of the table, forming an ore concentrating bed on the other division of the table by arresting the advancing movement of the ore and changing the direction of the movement of the gangue and middlings and removing the gangue and middlings from off the ore and maintaining the ore bed while the partially separated mass is being delivered on the bed, the gangue and middlings removed from the bed and the ore drawn off from the under surface of the bed.

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

WILLIAM W. BONSON.

Witnesses:
M. M. CADY,
E. M. NOONAN.