

F. L. BUCHANAN.

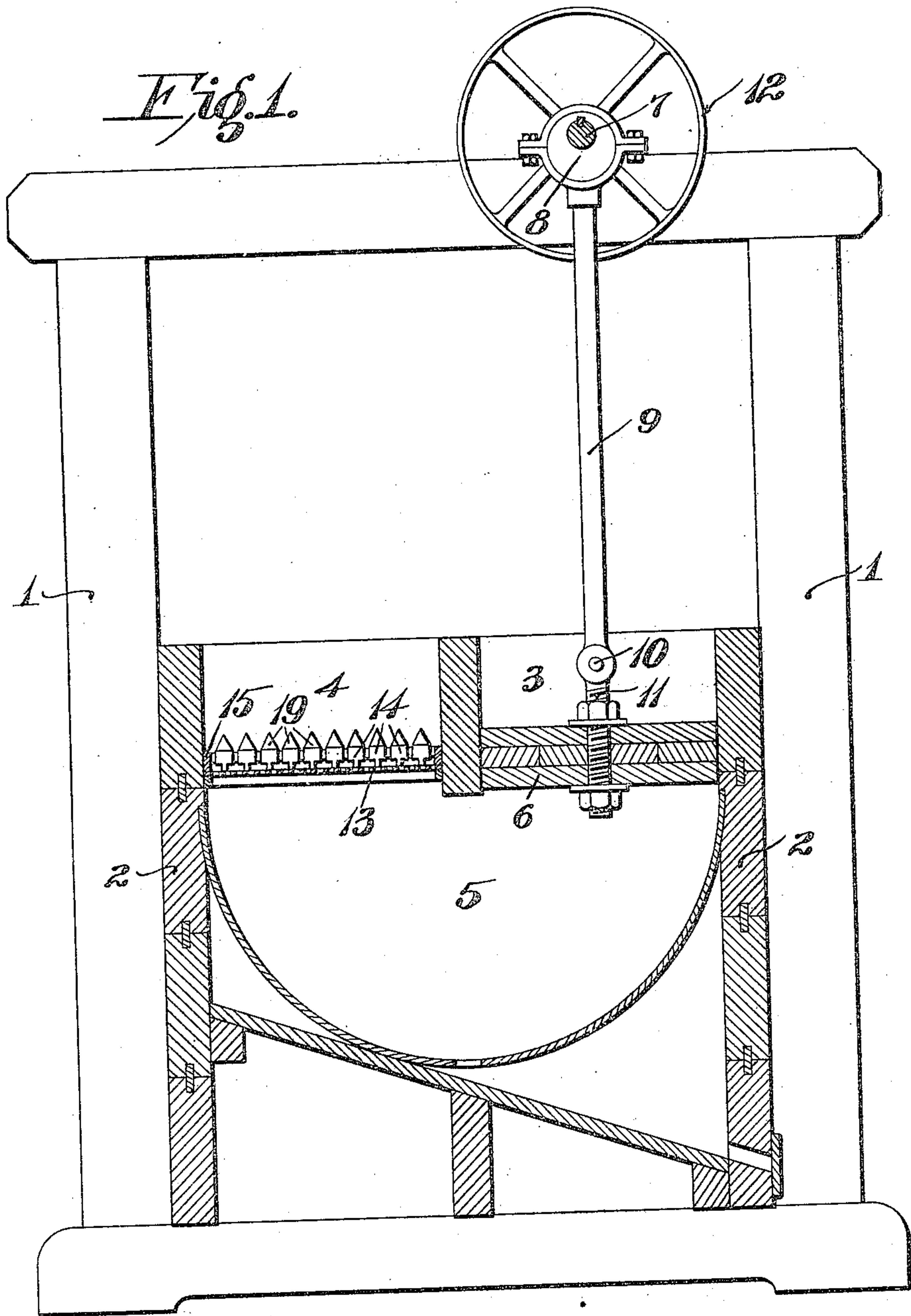
JIG.

APPLICATION FILED JAN. 17, 1910.

Patented June 28, 1910.

2 SHEETS—SHEET 1.

962,618.



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2 SHEETS—SHEET 2.

Fig. 2.

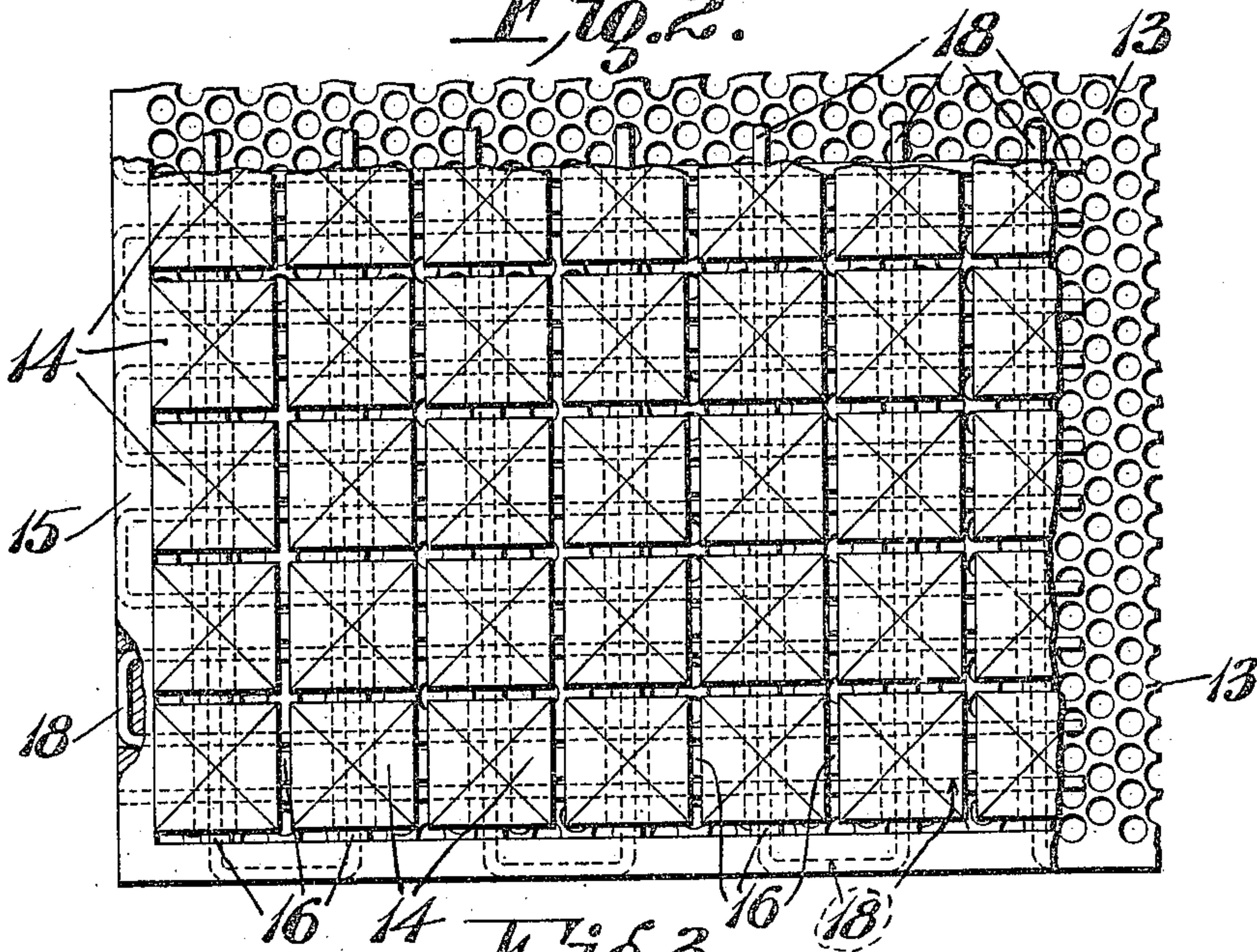


Fig. 3.

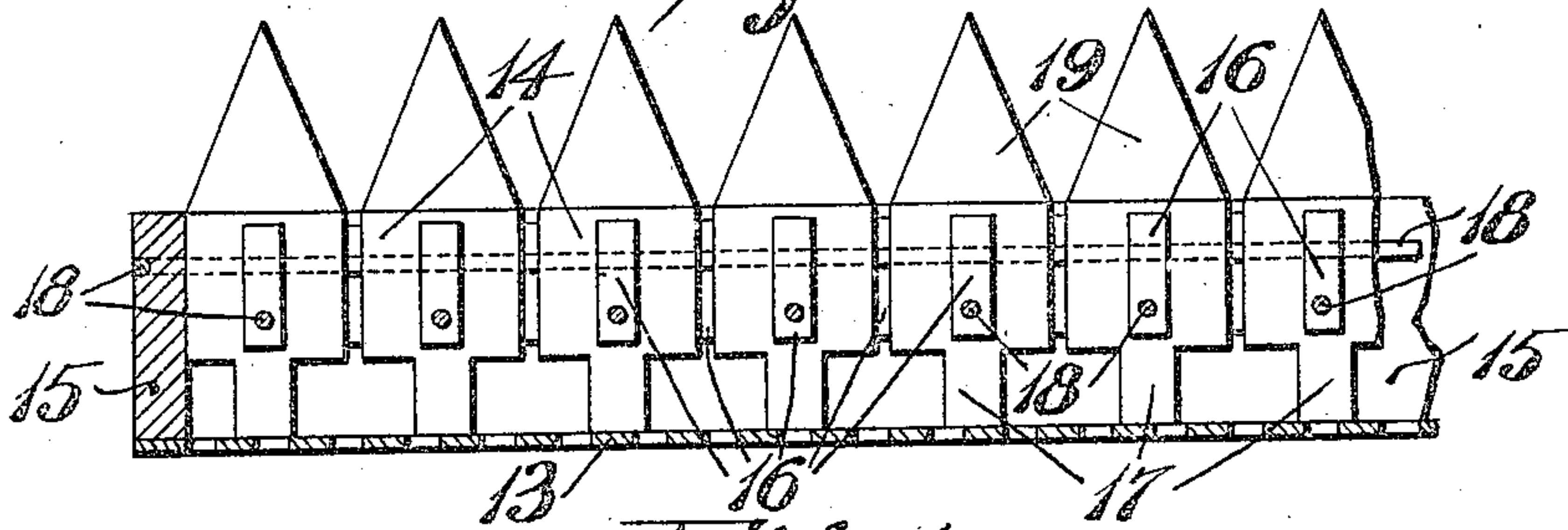


Fig. 4.

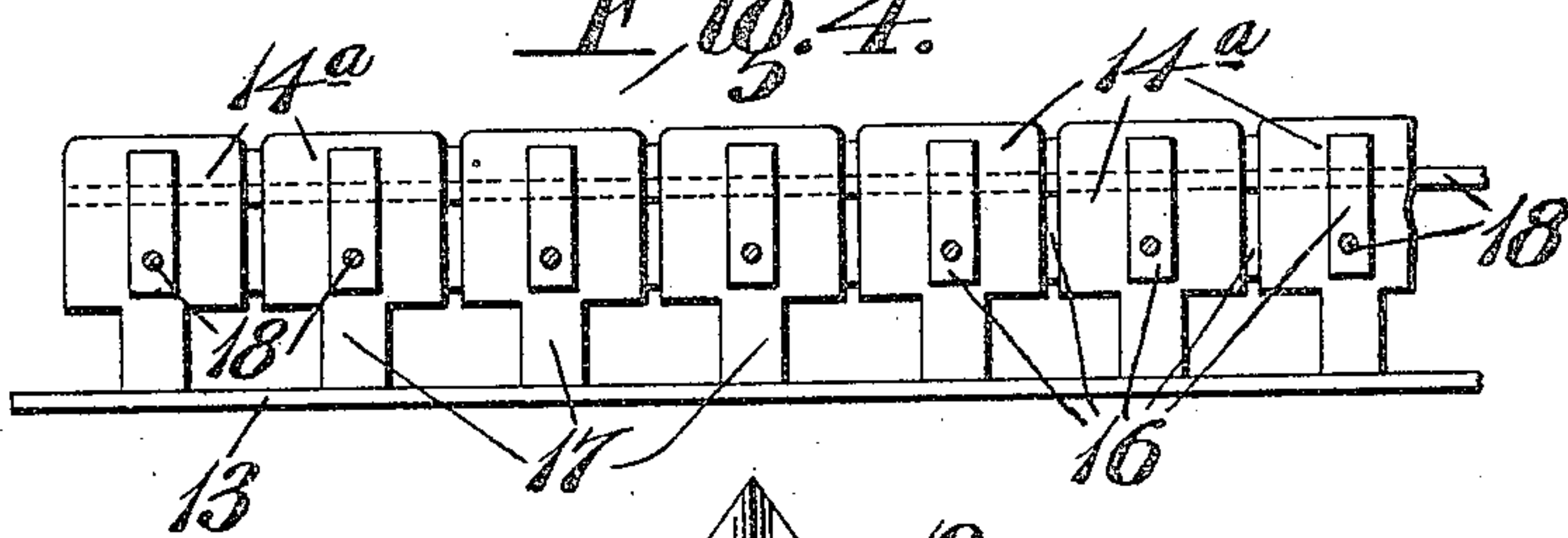
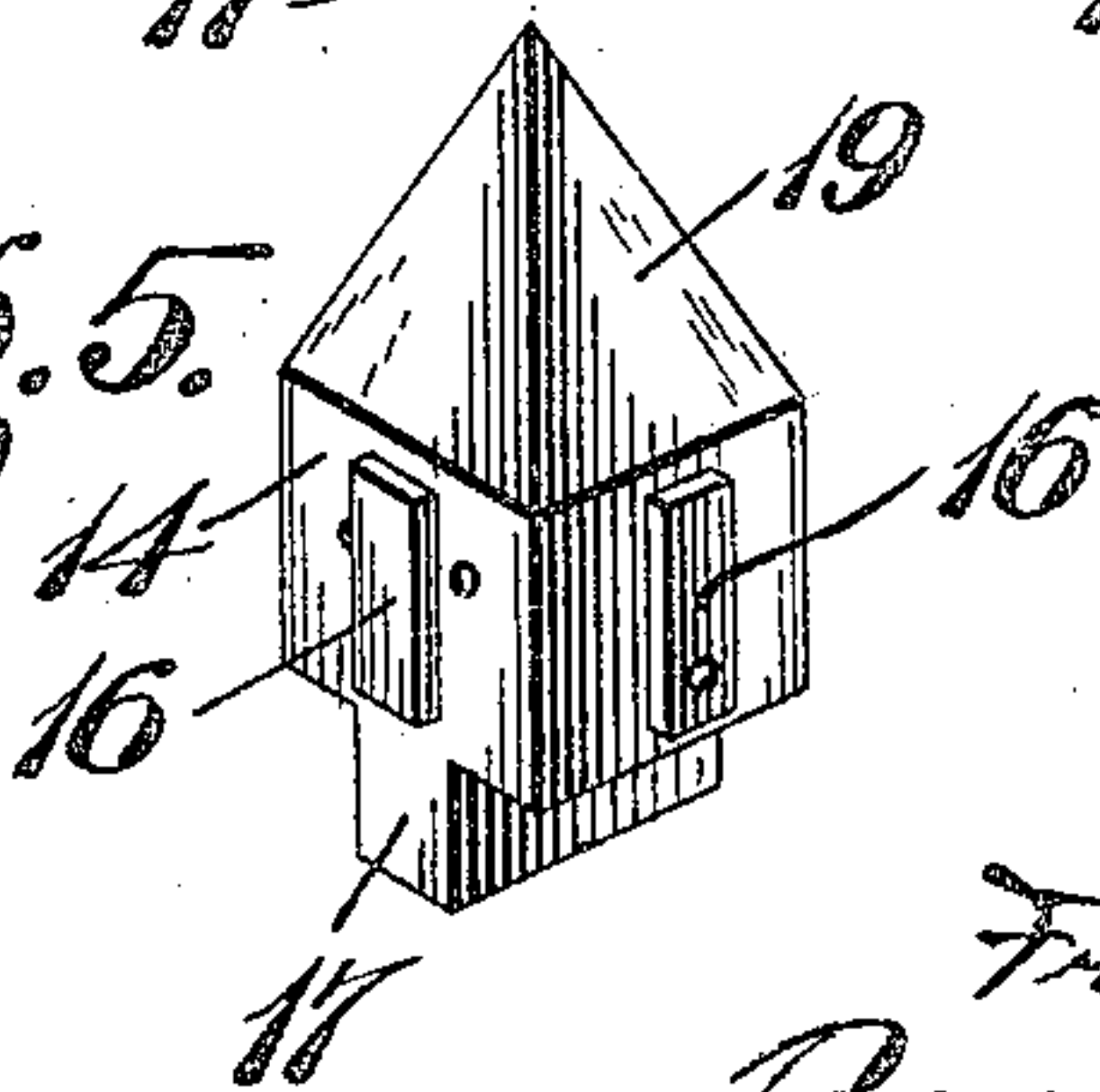


Fig. 5.



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UNITED STATES PATENT OFFICE.

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JIG.

962,618.

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To all whom it may concern:

Be it known that I, FRANK L. BUCHANAN, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Jigs, of which the following is a specification.

This invention relates to devices for jigg-
ing or separating ores.

10 It has for its principal objects to secure a maximum saving of values; to minimize the expense incidental to the separation and concentration of medium and low grade ores; to obviate the necessity of using a mat of
15 specially selected ore for the ore bed; and to improve generally upon jigs of the Hartz type.

Generally speaking, a jig of the Hartz type comprises a two compartment water
20 tank, the compartments being connected together at the bottom of the tank; a horizontal sieve in one compartment, and a plunger having an upward and downward movement, produced by various devices, such as
25 cams, cranks, eccentrics, etc., in the other compartment. The ore properly crushed or pulverized with its accompanying rock, earth, etc., is fed to the jig over the wire sieve, and both compartments are filled by
30 a continuous flow of water and the plunger is set in motion. The downward stroke of the plunger will force a quantity of water into the other compartment and upward through the wire sieve into the mixture of
35 metallic ore and gangue resting on it. The force of this upward flow of water through the mixture raises it off the wire sieve and for an instant holds it in suspension; the heavy particles of metallic ore or "concentrates" settle to the sieve, and the particles
40 of rock, earth, etc., are driven to the top where they are freed from the jig by a current of water flowing over the wire sieve. The fine concentrates go through the sieve
45 into the lower portion of the tank or "hutch" of the jig, whence they are removed through a hutch-cock. After a "bed" varying in thickness from 1½ to 3 inches of coarse concentrates has accumu-

lated on the sieve the accumulating surplus 50
is removed through a "side draw" or other types of ore bed draws. In practice, this ore bed is usually composed of specially selected coarse concentrates or metallic ore of the same kind to be separated and saved, 55
and it is placed on the screen preparatory to operating the jig. Therefore, in separating and concentrating gold or other precious metals, it is obvious that the ore bed or mat is quite expensive, intrinsically, and 60
it requires the services of expert ore sorters to select the same.

My invention, therefore, consists specially in a mechanically constructed mat to take the place of the ordinary ore bed; and, further, it consists in the parts and arrangements and combinations of parts hereinafter described and claimed. 65

In the accompanying drawings which form part of this specification and wherein 70
like symbols refer to like parts wherever they occur, Figure 1 is a vertical section through a jig embodying my invention; Fig. 2 is a fragmentary plan view of the screen and mat on an enlarged scale; Fig. 3 is a 75
vertical section through the screen and mat shown in Fig. 2; Fig. 4 is a view similar to Fig. 3, but showing a modification of the mat; and Fig. 5 is a detail view of one of the units of the mat. 80

The jig illustrated in the drawings comprises a frame 1 which may be constructed in the usual manner. Within the frame is a tank comprising side and end walls 2 which are preferably constructed of heavy 85
lumber. The tank is divided into two upper chambers or compartments 3 and 4 which communicate with a lower compartment 5. In the compartment 3 is fitted a plunger or piston 6 which is reciprocated vertically 90
therein. Any well known or desirable eccentric or crank device may be employed to actuate the plunger. As shown in the drawings, a horizontal driving shaft 7 is mounted on top of the frame 1 and carries an 95
eccentric 8. A pitman 9 is rigidly connected at its upper end to the eccentric 8 and its lower end is pivotally connected as at 10 to

a member 11 which is secured to the plunger. By this arrangement, the piston or plunger 6 is reciprocated when the shaft 7 is rotated. A pulley 12 or other suitable driving device is mounted on the shaft 7 and it may be connected by a belt or other driving device with some suitable source of power.

A screen 13 is mounted in the lower part of the compartment 4. This screen may be either a woven wire fabric, or a perforated sheet of metal as shown in the drawings. A mat comprising a multiplicity of blocks or members 14 which are spaced uniformly apart is placed in the compartment 4 above the screen 13. This mat is, preferably, detachably secured so that interchangeable mats having spaces or openings of various sizes may be used to suit ores which are crushed or pulverized into particles of different grades or sizes. As shown in the drawings, the mat comprises a rectangular frame 15 in which the blocks 14 are fitted. The blocks are provided on their side faces with spacing lugs or ribs 16, the depth of the ribs corresponding to the desired width of the space between the blocks. In practice, it is only necessary to provide the ribs on two right-angular faces of the blocks. The blocks 14 are undercut on opposite sides so as to provide an enlarged space between the lower portions of the blocks. The rib 17, formed by undercutting the blocks, rests upon the screen. The blocks are provided with transverse perforations so that they may be strung on wires or rods 18 which are secured to the frame 15. Preferably, a double set of wires extend through the blocks in one direction, and a single wire extends through the blocks crosswise thereof. The wires or rods are drawn taut across the frame 15, and they may be secured thereto in any desirable manner. As shown in the drawings, a continuous wire is threaded through perforations in the frame and looped back and forth across the frame. The top portions of the blocks 14 are preferably pointed or pyramidal as at 19, so as to provide a multiplicity of projections above the narrow spaces between the blocks. In some cases, however, blocks 14^a whose tops are flat as shown in Fig. 4, but which are otherwise similar to the blocks 14, may be substituted in lieu of said blocks 14.

In the operation of the device, a mat constructed as herein described and whose narrow spaces or mesh are of a size corresponding to the size of the particles of the crushed ore, is secured in the compartment on top of the screen 13. The crushed ore is then fed into the compartment 4 on top of the mat. The tank is then filled with water in the usual manner and the piston or plunger 6 is reciprocated. On the down stroke of the

piston, the water in the compartment 5 is forced through the screen 13 upwardly between the blocks 14 and through the mass of crushed ore and gangue on the mat. The force of this upward flow of water through the mixture raises it off the mat and momentarily holds it in suspension as in the case of the ordinary jig which is provided with a mat of pieces of ore. On the return or up stroke of the piston, the heavy metallic particles or concentrates settle to the mat and the particles of rock or gangue are driven to the top of the mass where they are freed from the jig by the current of water flowing over the mat. The fine concentrates are drawn through the narrow spaces between the blocks or units of the mat into the larger spaces provided by the undercut portions of the blocks or units. The fine concentrates thus drawn through the mat go through the sieve into the compartment 5 or hutch of the jig, whence they are removed through the hutch-cock or valve in the usual manner.

In order to secure a regular movement of the water in the hutch or compartment 5, the bottom 5^a of the same is rounded. This is especially desirable where the particles of the concentrates are very fine. By providing the larger spaces between the lower portions of the blocks 14 of the mat and the top of the screen 13, the screen is at all times cleared and the disadvantage of clogging as in the case of the ordinary type of sieve and ore bed is overcome. So, too, the arrangement of mat permits of the use of a much larger mesh or perforation in the screen than can be ordinarily used for particles of ore of a certain size. By mounting the blocks or units on strands of wires or rods which are drawn taut, a certain degree of flexibility is given to the mat; and the blocks have a slight rocking and torsional movement which has the effect of materially aiding in separating the particles of the gangue from the metallic ore owing to the slight rubbing or hammering action of the blocks upon the particles of the crushed ore. This action, while being slight does have the effect above set forth and in a measure adds to the efficiency of the device.

Obviously, my device admits of considerable modification without departing from my invention. Therefore, I do not wish to be limited to the specific construction and arrangement shown.

What I claim and desire to secure by Letters Patent is:

1. A jig comprising a tank having a compartment in which is fitted an ore-supporting mat, said mat comprising a multiplicity of units which are spaced uniformly apart on all sides and secured together in a body,

and means for intermittently forcing a quantity of water upwardly through said mat and a mass of crushed ore thereon.

2. A jig comprising a tank having a compartment in which is secured an ore-supporting mat, said mat comprising a multiplicity of units which are spaced uniformly apart all around and secured together in a body, said units having projections on their top sides, and means for intermittently forcing a quantity of water upwardly through said mat and a mass of crushed ore thereon.

3. A jig comprising a tank having a compartment in which is secured an ore-supporting mat, said mat comprising a multiplicity of units which are spaced uniformly apart on all sides and secured together in a body, a screen secured in the compartment under said mat, and means for intermittently forcing a quantity of water upwardly through said screen, mat and a mass of crushed ore thereon.

4. A jig comprising a tank having a compartment in which is secured a horizontal screen, an ore-supporting mat secured in said compartment and resting upon said screen, said mat comprising a multiplicity of units which are spaced uniformly apart and secured in a body, said units having pointed upper sides and undercut under sides, and means for intermittently forcing a quantity of water upwardly through said screen, mat and a mass of crushed ore thereon.

5. A jig comprising a tank having a compartment in which is secured an ore-supporting mat, said mat having a multiplicity of vertical slots therethrough, a multiplicity of pointed projections extending upwardly from the top side of said mat between the several slots therein, and said mat having a multiplicity of recesses in its underside which communicate with the slots therein, a screen secured in said compartment beneath the mat, and means for intermittently forcing a quantity of water upwardly through said screen, mat and a mass of crushed ore thereon.

6. A jig comprising a tank having a compartment in which is secured an ore-supporting mat, said mat having a multiplicity of intersecting slots therethrough, a multiplicity of projections extending upwardly from the top side of said mat between the several intersecting slots therein, and means for intermittently forcing a quantity of water upwardly through said mat and a mass of crushed ore thereon.

7. A jig comprising a tank having a compartment in which is secured an ore-supporting mat, said mat comprising a frame having a multiplicity of wires or rods stretched across the same, and a multiplicity

of units strung on said wires or rods and spaced substantially the same distance apart on all sides, and means for intermittently forcing a quantity of water upwardly through said mat and a mass of crushed ore thereon.

8. A jig comprising a tank having a compartment in which is secured an ore-supporting mat, said mat comprising a frame having a multiplicity of wires or rods stretched across the same, a multiplicity of blocks strung on said wires or rods and spaced uniformly apart, said blocks having pointed projections on their upper sides, and means for intermittently forcing a quantity of water upwardly through said mat and a mass of crushed ore thereon.

9. A jig comprising a tank having a compartment in which is secured a screen, an ore-supporting mat secured in said compartment on top of said screen, said mat comprising a frame having a multiplicity of wires or rods stretched across the same, and a multiplicity of blocks strung on said wires or rods and spaced uniformly apart, said blocks having pointed top sides and undercut bottom sides, and means for intermittently forcing a quantity of water upwardly through said screen, mat and a mass of crushed ore thereon.

10. A jig comprising a tank having a compartment in which is secured a screen, an ore-supporting mat secured in said compartment on top of said screen, said mat comprising a frame having a multiplicity of wires or rods stretched across the same, and a multiplicity of blocks strung on said wires or rods and spaced uniformly apart, said blocks having undercut bottom sides, and means for intermittently forcing a quantity of water upwardly through said screen, mat and a mass of crushed ore thereon.

11. A mat for jigs comprising a frame, a multiplicity of like blocks which are spaced substantially the same distance apart on all sides and provided with crossed transverse holes therethrough, and a series of crossed wires stretched across said frame from side to side thereof, respectively, and threaded through the crossed holes in said blocks.

12. A mat for jigs comprising a frame, a multiplicity of like blocks which are spaced substantially the same distance apart on all sides, said blocks having undercut bottom sides and being provided with crossed transverse holes therethrough, and a series of crossed wires stretched across said frame from side to side thereof, respectively, and threaded through the crossed holes in said blocks.

13. A mat for jigs comprising a frame, a multiplicity of like blocks which are spaced substantially the same distance apart on all

sides, said blocks having projections on their top sides and being provided with crossed transverse holes therethrough, and a series of crossed wires stretched across said frame from side to side thereof, respectively, and threaded through the crossed holes in said blocks.

14. A mat for jigs comprising a frame, a multiplicity of like blocks which are spaced substantially the same distance apart on all sides and provided with crossed transverse holes therethrough, said blocks having pro-

jections on their top sides and having undercut bottom sides, and a series of crossed wires stretched across said frame from side to side thereof, respectively, and threaded through the crossed holes in said blocks.

Signed at St. Louis, Mo., this 15th day of January, 1910.

FRANK L. BUCHANAN.

Witnesses:

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J. B. MEGOWN.