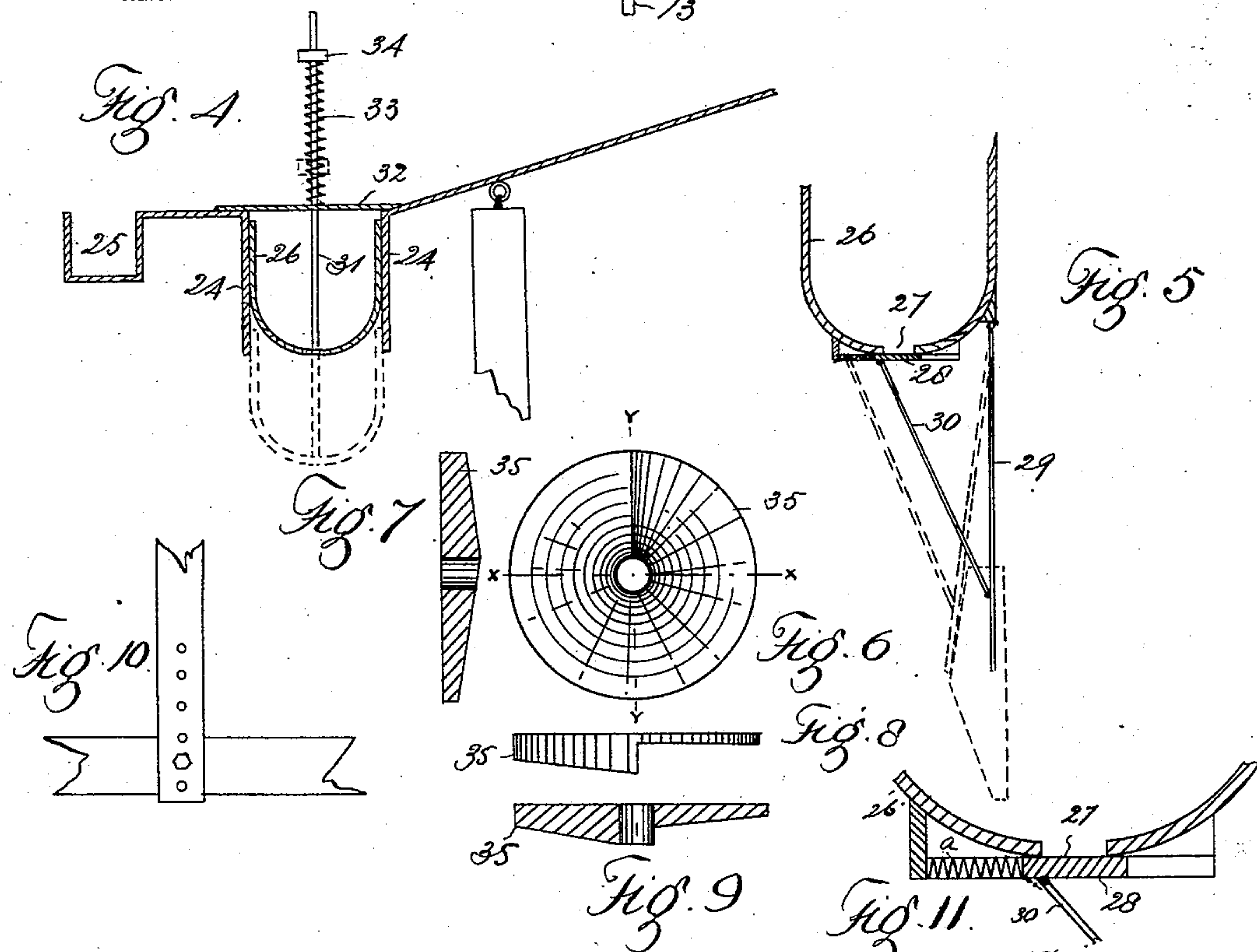
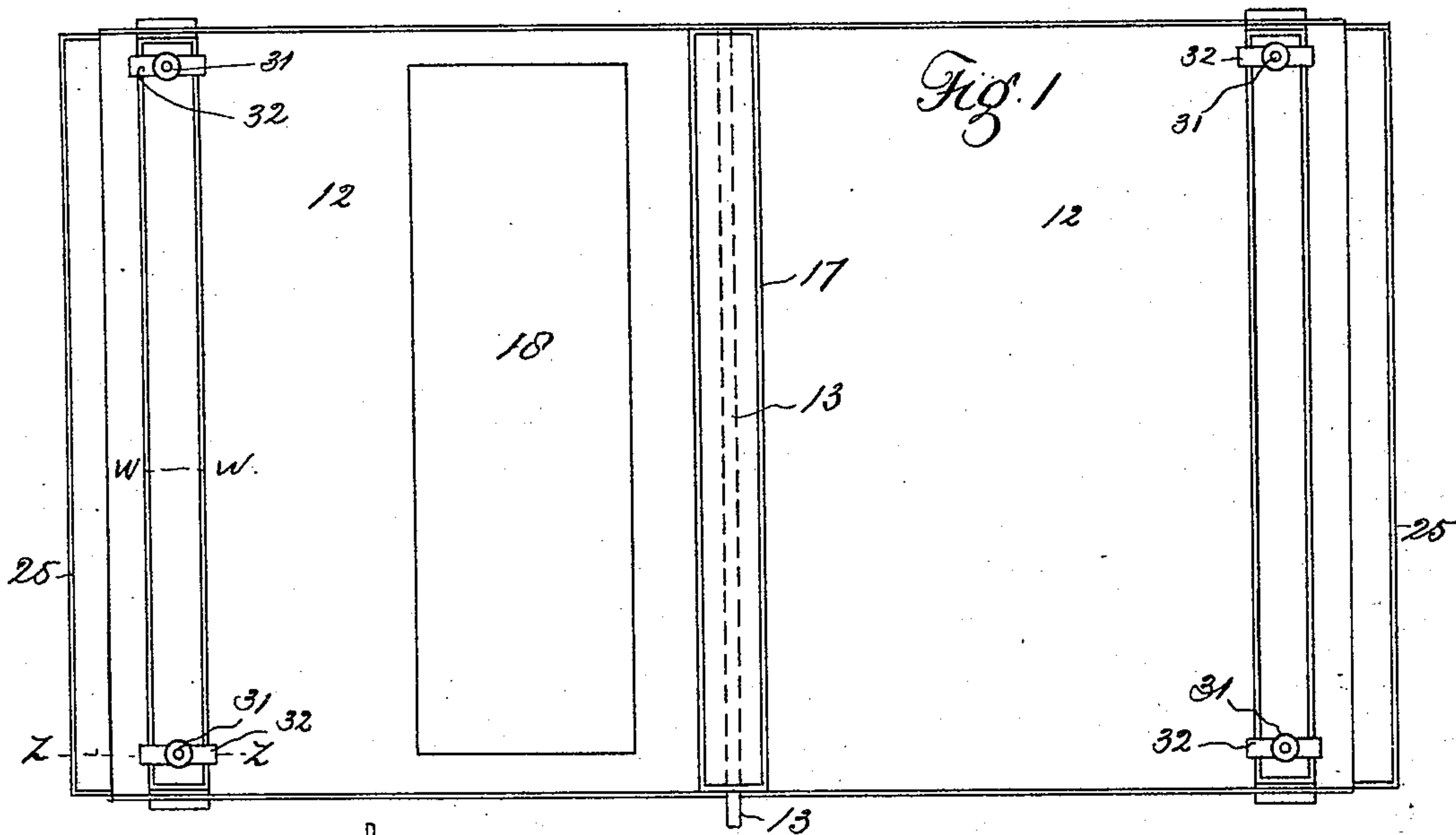


3 Sheets—Sheet 1.

No. 477,936.

Patented June 28, 1892.



Witnesses  
G. J. Holland  
J. M. Connell

Inventor  
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A. J.'Brien

(No Model.)

3 Sheets—Sheet 2.

E. A. HOCKLEY.  
ORE CONCENTRATOR.

No. 477,936.

Patented June 28, 1892.

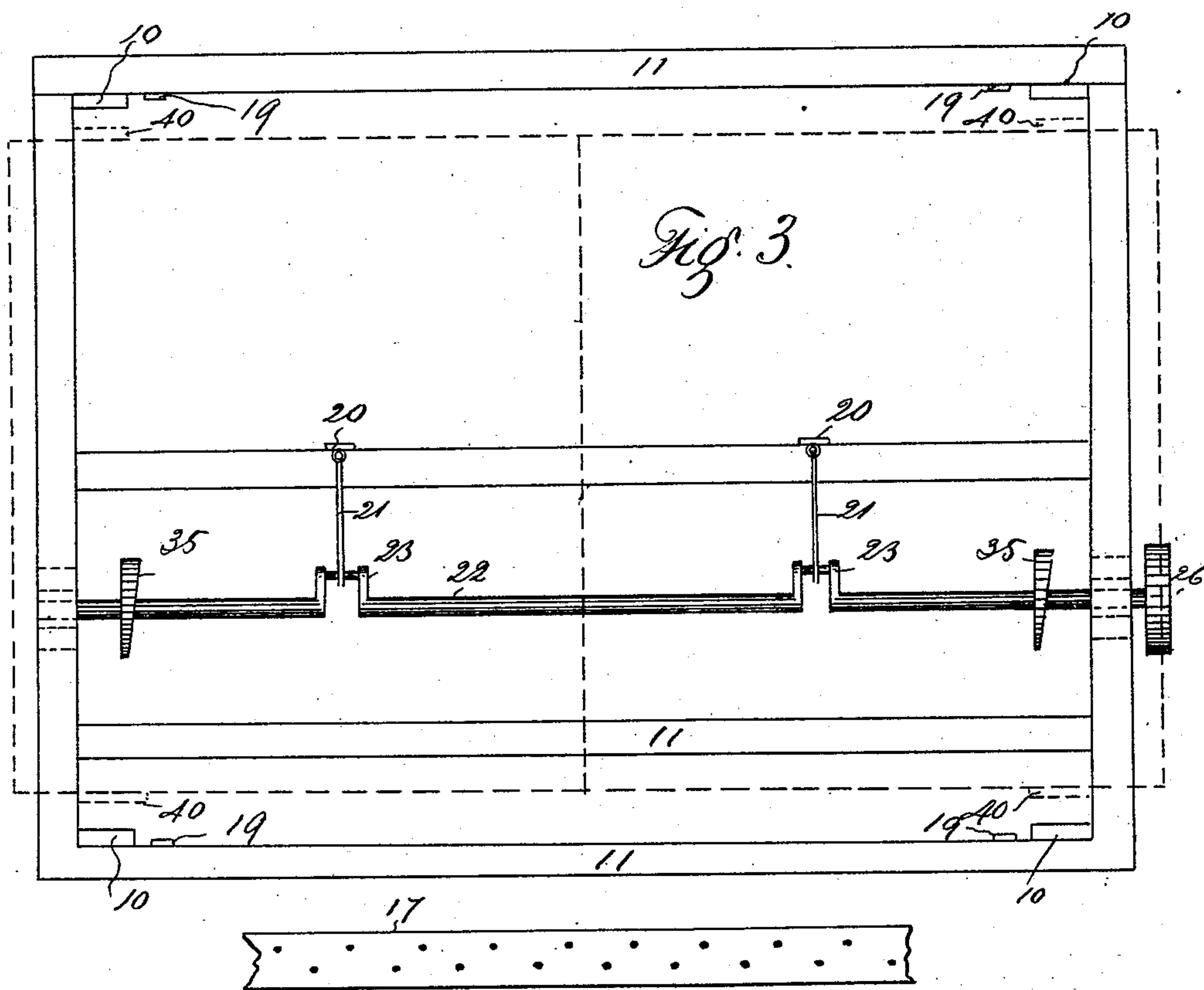
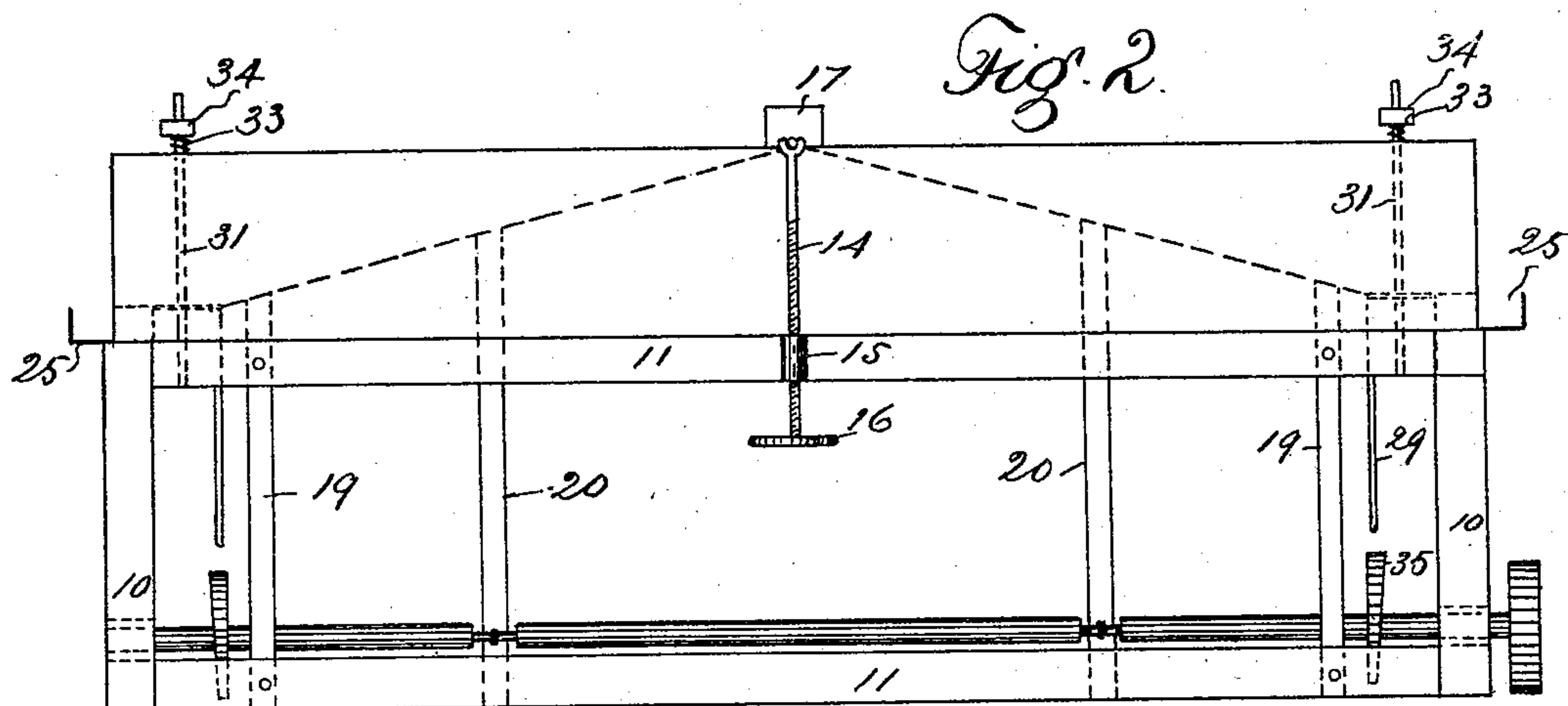


Fig. 12.

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(No Model.)

3 Sheets—Sheet 3.

E. A. HOCKLEY.  
ORE CONCENTRATOR.

No. 477,936.

Patented June 28, 1892.

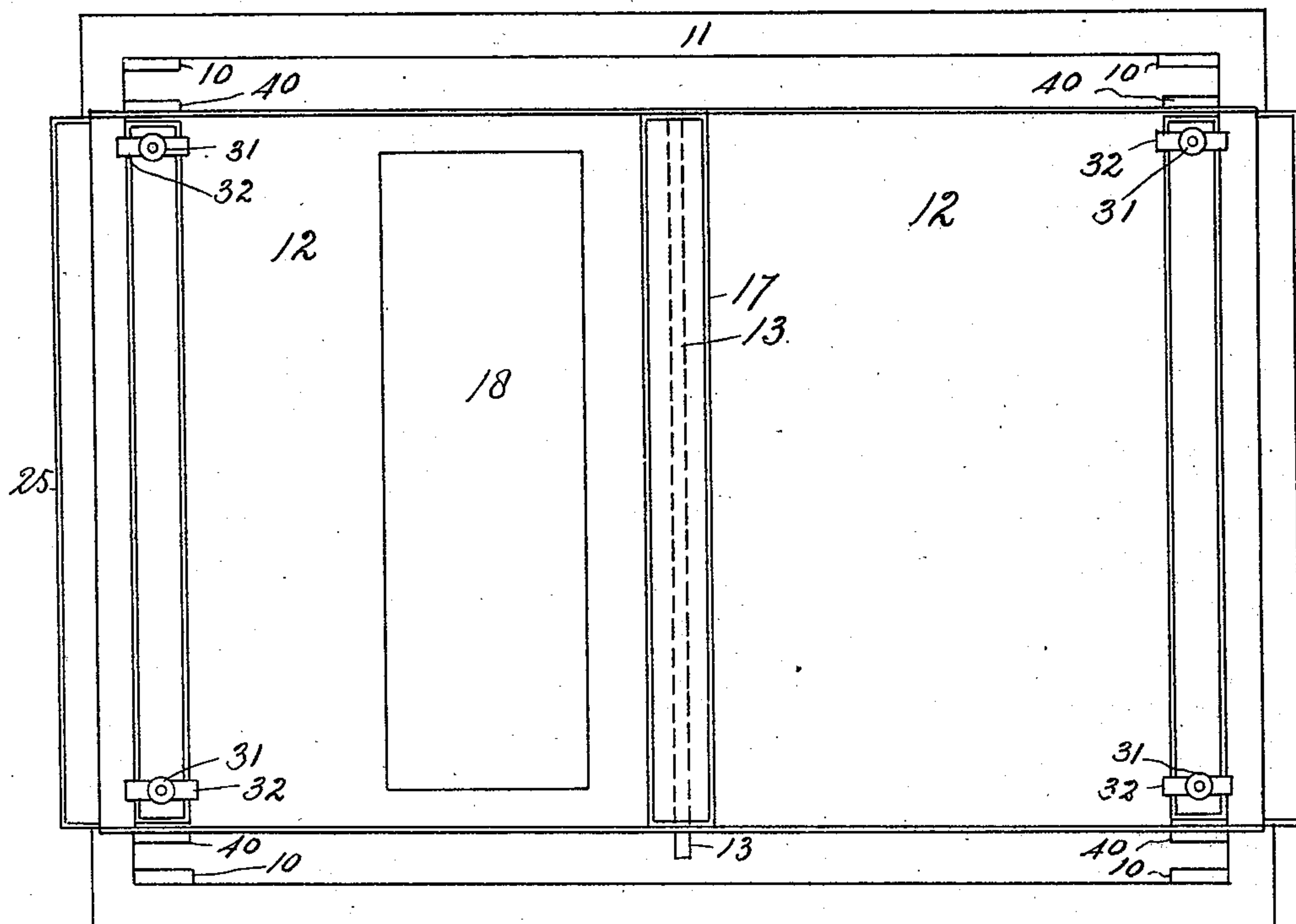


Fig. 13

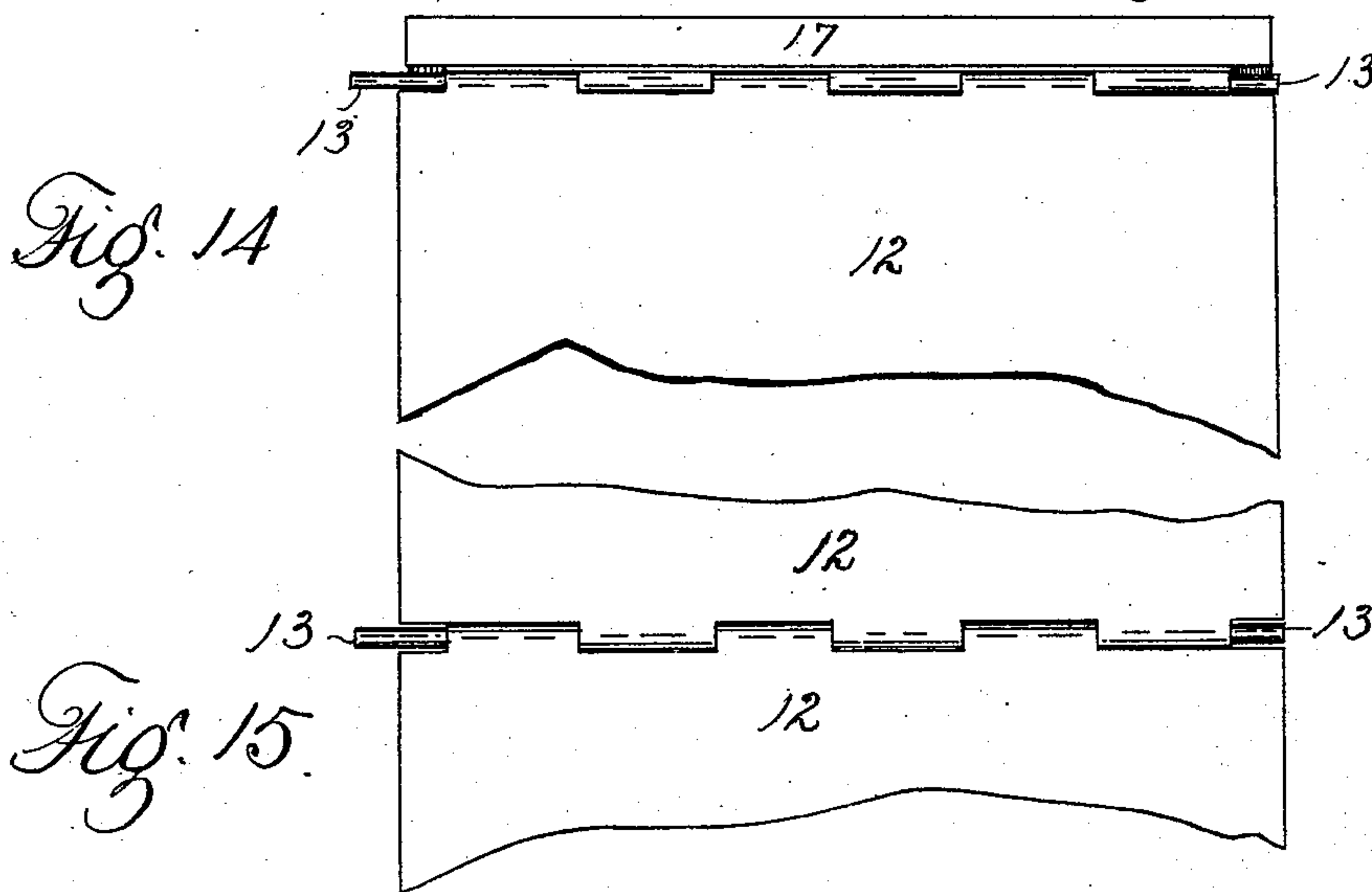


Fig. 14

Fig. 15

WITNESSES:

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Wm. M. Connell

INVENTOR  
Edgar A. Hockley  
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ATTORNEY.



# UNITED STATES PATENT OFFICE.

EDGAR A. HOCKLEY, OF OURAY, COLORADO, ASSIGNOR OF ONE-HALF TO  
ROSELLE W. HASKINS, OF SAME PLACE.

## ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 477,936, dated June 28, 1892.

Application filed August 1, 1891. Serial No. 401,425. (No model.)

*To all whom it may concern:*

Be it known that I, EDGAR A. HOCKLEY, a citizen of the United States of America, residing at Ouray, in the county of Ouray and State of Colorado, have invented certain new and useful Improvements in Ore-Concentrators; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in ore-concentrators of the gravity class; and the object of the invention is to produce a thorough separation between the mineral and the gangue, collect the concentrates in bulk, and discharge them automatically and at intervals from the table. The discharge of the concentrates is determined by their gravity.

The invention will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan view of my improved gravity concentrating-table. Fig. 2 is an end elevation of the same. Fig. 3 is a plan view with the table proper removed, its position being shown in dotted lines. Fig. 4 is a vertical section, on an enlarged scale, taken through one side of the table on the line *z z*, Fig. 1. Fig. 5 is a similar section taken on the line *w w*, Fig. 1. This view illustrates the manner of automatically discharging the concentrates, the actuating-cam being shown in dotted lines. Figs. 6, 7, 8, and 9 are enlarged detail views of the rotating cam, Fig. 6 being an end view of the cam-face; Fig. 7, a section on the line *x x*, Fig. 6; Fig. 8, an edge view; and Fig. 9, a section on the line *y y*, Fig. 6. Fig. 10 is a fragmentary view, on an enlarged scale, illustrating the vertical adjustment of the springs supporting the table. Fig. 11 is a detail of construction. Fig. 12 is a fragmentary view of the feed-trough. Fig. 13 is a top or plan view of the machine. Fig. 14 is a fragmentary view of one side of the table, showing the feed-trough in place. Fig. 15 is a fragmentary top view of the table with the feed-trough removed.

This view is designed to show the manner of connecting the sections of the table with the rod 13.

In the views, wherein similar reference characters indicate corresponding parts of the mechanism, let the numerals 10 10, &c., designate the upright frame parts, and 11 11, &c., the horizontal connecting-beams, forming a suitable rectangular supporting-frame for the table, composed of two sections 12 12, provided with a central hinge 13, consisting of a transverse rod, to which the inner or adjacent edges of the sections are so connected that their inclinations can be adjusted at will by the use of a screw-rod 14, pivoted to the hinge-rod at one extremity and passing through a threaded aperture formed in a lug 15, secured to the frame-work of the machine. The free extremity of this rod is provided with a hand-wheel 16, whereby it may be easily turned for purposes of adjustment. Supported, also, by the central hinged rod of the table is a transverse perforated feed-trough 17, into which the material to be treated is first discharged in the form of a pulp and from which it is fed to both sections, which are inclined downwardly in opposite directions from the hinging-center. Each section may be provided with an amalgamated plate 18, the purpose of which is to catch the free gold passing thereover. The table is further supported by springs 19 and 20, which are secured to the stationary frame-work at one extremity and connected with the under surface of the table at the opposite extremity. These springs are adjustable, as shown in Fig. 10, to permit the changing of the inclination of the sections of the table. There are preferably four springs 19, two supporting the outer portions of each section 12, and two springs 20, centrally located and to which are attached at any suitable point connecting-rods 21, said rods having their opposite extremities connected with cranks 23 of motor-shaft 22.

In the outer portion of each section 12 of the table and lying parallel or approximately parallel with the hinging-center is formed a sort of open guide-trough 24. Continuing outward from this trough each section 12 is formed into a waste-trough 25. The trough 24 is open at the bottom, its sides being suitably con-



nected at the ends. These troughs 24 and 25  
 may be formed integral with the table-sec-  
 tions. Within each open trough is supported  
 and guided the vertically-movable trough 26,  
 5 provided with a longitudinal slot 27 in the  
 bottom. Beneath this slot is located a mov-  
 able spring-actuated slide 28, adapted to close  
 the slot normally. Pivoted to one side of  
 trough 26 is a downwardly-projecting lever-  
 10 arm 29, to which is pivoted one extremity of  
 a connecting-rod 30, the opposite extremity  
 of this rod being pivoted to slide 28. Trough  
 26 is supported by a rod 31, made fast to the  
 bottom of each extremity thereof, which is  
 15 closed to permit the attachment of the rods,  
 which extend upward, passing through aper-  
 tures in cross-pieces 32. Extending across the  
 top of troughs 24 above cross-pieces 32 and  
 surrounding each rod 31 is a coil-spring 33,  
 20 the lower extremity of which engages the  
 cross-piece, while the upper extremity is  
 connected with a stop 34, formed upon the  
 rod. These arms move freely in the open-  
 ings formed in the cross-pieces supporting the  
 25 springs.

The troughs 26 receive their concentrates,  
 the gravity of which causes the troughs to de-  
 scend until their laterally-movable arms 29  
 are engaged by cams 35, mounted upon shaft  
 30 22. These cams are of irregular shape, as  
 shown in the drawings, and so located that  
 when the troughs 26 descend sufficiently to  
 bring the arms 29 in the path of the cams  
 these arms are moved to one side sufficiently  
 35 to open the slides 28 through the medium of  
 the connecting-rod 30. This movement is  
 illustrated by dotted lines in Fig. 5.

In the operation of the machine motion may  
 be transmitted from any suitable motor to  
 40 shaft 22 by extending a belt from the motor  
 to pulley 36. As this shaft rotates an oscil-  
 lating movement is imparted to the table  
 through the medium of the connecting-rods  
 21 and cranks 23. The ends of troughs 24  
 45 are provided with resilient buffers 40, which  
 may engage the uprights of the frame-work,  
 giving the tables a sufficient concussion or  
 jar to separate the mineral from the gangue.  
 From the feed-trough 17 the material to be  
 50 treated passes to both sections of the table  
 and down the inclined sides of these sections  
 to the troughs 26, in which settles the con-  
 concentrates, the lighter gangue collecting on  
 top and finally passing over into the waste-  
 55 troughs 25. The springs 23 are so adjusted  
 that when a sufficient quantity of concen-  
 trates is collected in the troughs their gravity  
 will cause the troughs to move downward,  
 bringing the lever-arms 29 in the path of the  
 60 cams 35, which engaging these arms give  
 them sufficient lateral movement to open slides  
 28, when the concentrates in the troughs im-  
 mediately pass out to a suitable receptacle  
 below. The troughs then being relieved of  
 65 their depressing load immediately return to  
 their normal elevated position, carrying arms

29 out of the path of the actuating-cams when  
 the slides 28, acted upon by the springs *a*,  
 return to the closed position, when the trough  
 begins to refill and the operation is repeated. 70

The springs 23 should be so regulated that  
 when the concentrates have escaped from  
 troughs 26 their gravity will be so diminished  
 that the springs will raise the troughs and  
 slides 28 will close before the gangue, or at 75  
 least any considerable portion thereof can es-  
 cape. It is believed this theory will hold  
 true in practice, since the concentrates will  
 be at the bottom of the trough and the gangue  
 at the top. 80

Having thus described my invention, what  
 I claim is—

1. The combination, with a concentrating-  
 table, of oscillating supporting-arms therefor,  
 means for actuating said arms, a spring-sup- 85  
 ported movable trough for the concentrates,  
 said trough having an opening, a spring-act-  
 uated slide normally closing said opening,  
 and means for opening the slide and discharg-  
 ing the concentrates, substantially as de- 90  
 scribed.

2. The combination, in a concentrating-ta-  
 ble, of two hinged oppositely-inclined sections,  
 springs supporting the table, means for oscil- 95  
 lating the same upon the springs, vertically-  
 movable troughs located at the outer edges  
 of the sections and provided with openings,  
 spring-actuated slides normally closing said  
 openings, and means for opening the slides  
 and discharging the concentrates as the 100  
 troughs are lowered by their gravity, substan-  
 tially as described.

3. In a concentrator, the combination of  
 a spring-supported oscillating table consist- 105  
 ing of hinged oppositely-inclined sections pro-  
 vided with movable troughs for the concen-  
 trates, said troughs having slots in the bot-  
 tom normally closed by spring-actuated slides,  
 laterally-movable arms connected with the 110  
 troughs and projecting downward, rods con-  
 necting these arms with said slides, and ro-  
 tating cams located below the troughs, where-  
 by when a sufficient quantity of concentrates  
 has settled in the troughs they move down- 115  
 wardly by gravity, bringing said arms in the  
 path of the cams, when the slides are opened  
 and the concentrates discharged, substantially  
 as described.

4. A concentrating-table provided with a ver- 120  
 tically-movable trough for collecting the con-  
 concentrates, a yielding support for said trough,  
 and means for automatically discharging the  
 concentrates from the trough at intervals reg-  
 ulated by their gravity, substantially as de-  
 scribed. 125

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

EDGAR A. HOCKLEY.

Witnesses:

D. W. POWERS,  
 C. W. HASKINS.