

(No Model.)

3 Sheets—Sheet 1.

U. S. GRANT.  
CONCENTRATOR.

No. 539,990.

Patented May 28, 1895.

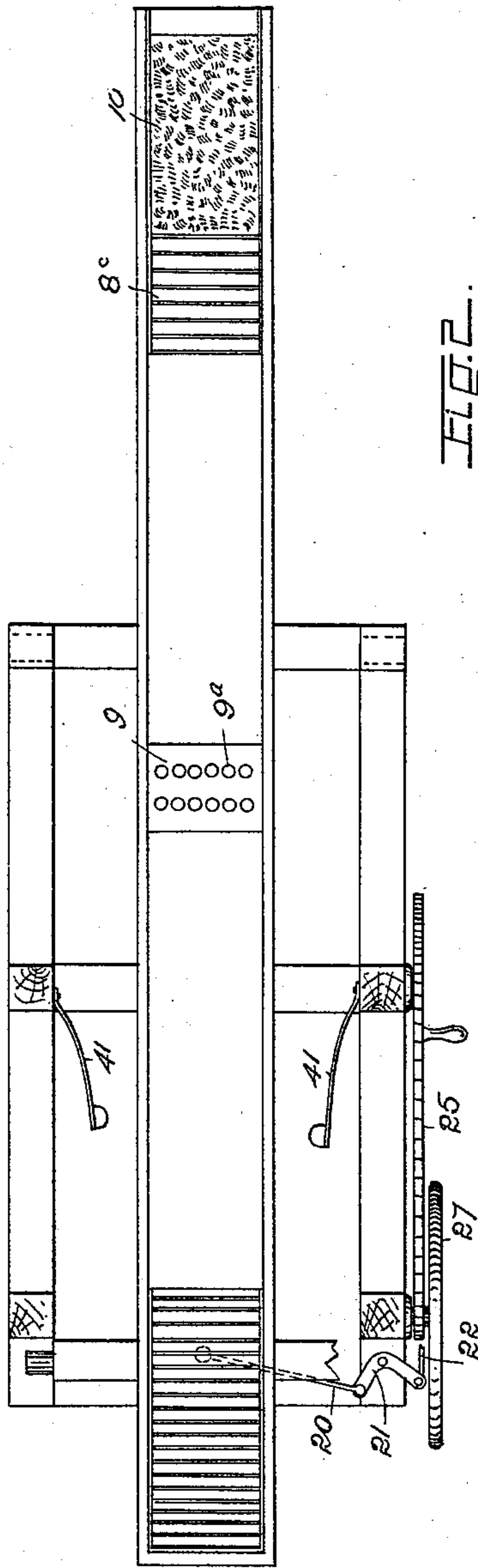


FIG. 2.

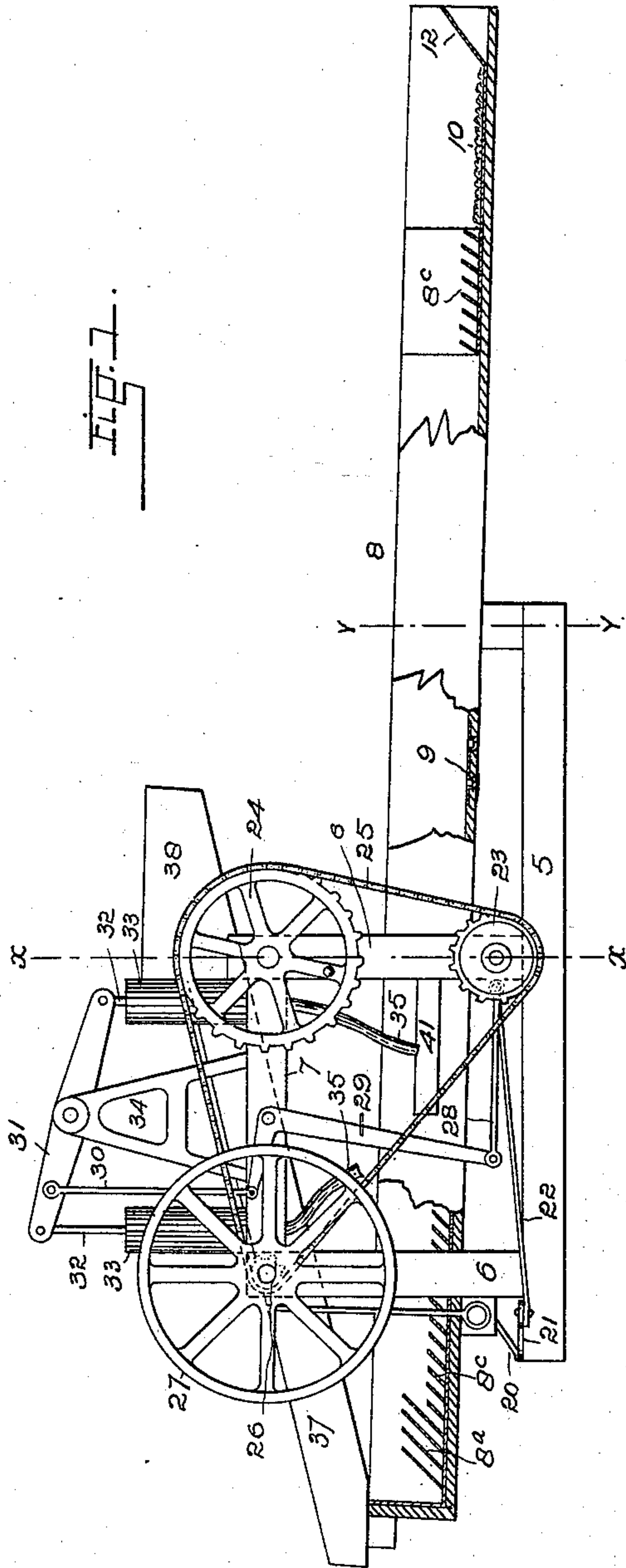


FIG. 1.

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(No Model.)

3 Sheets—Sheet 2.

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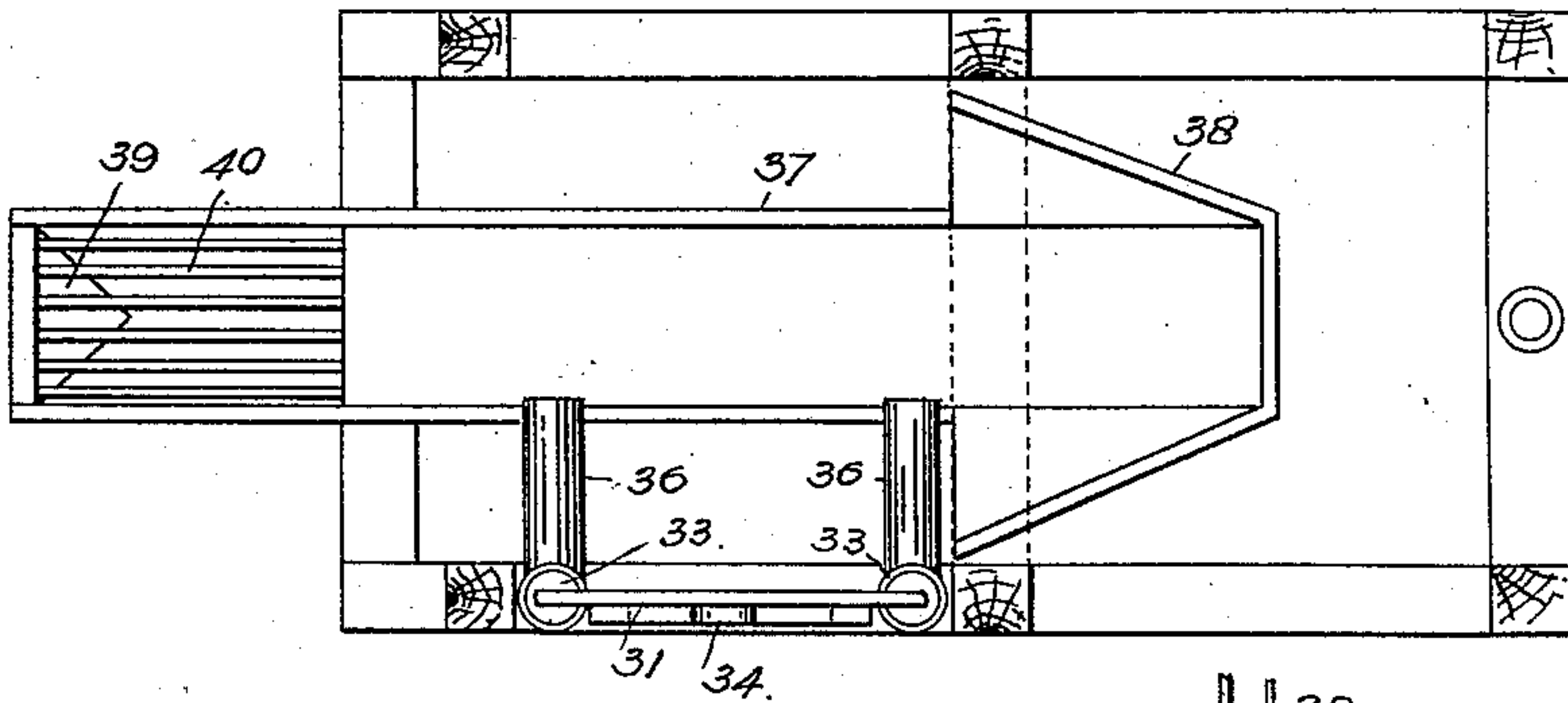


Fig. 3.

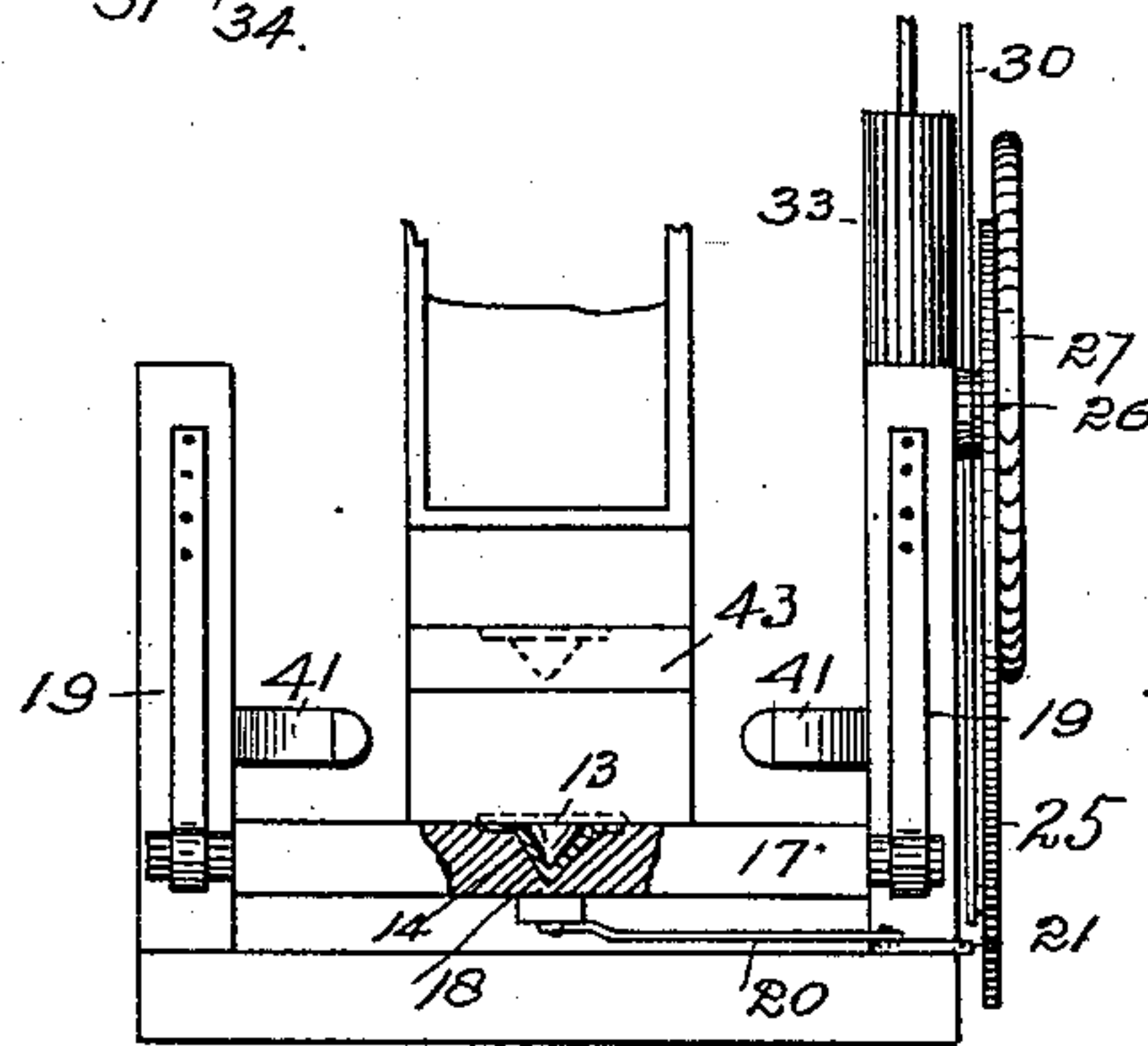


Fig. 4.

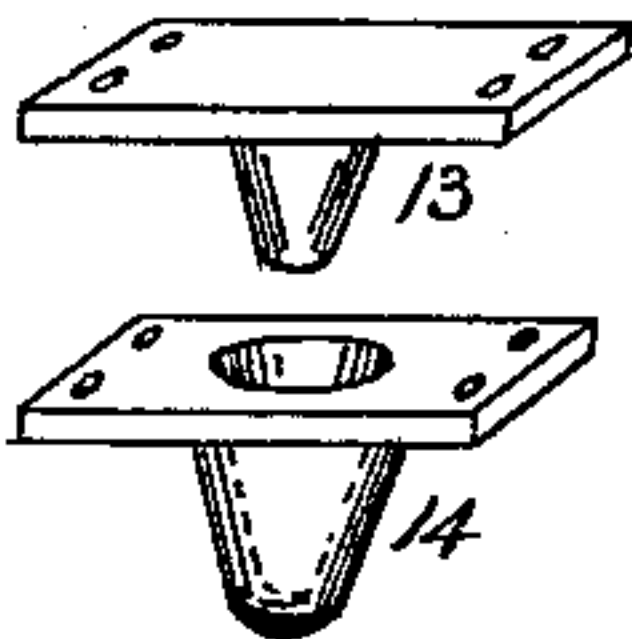


Fig. 5.

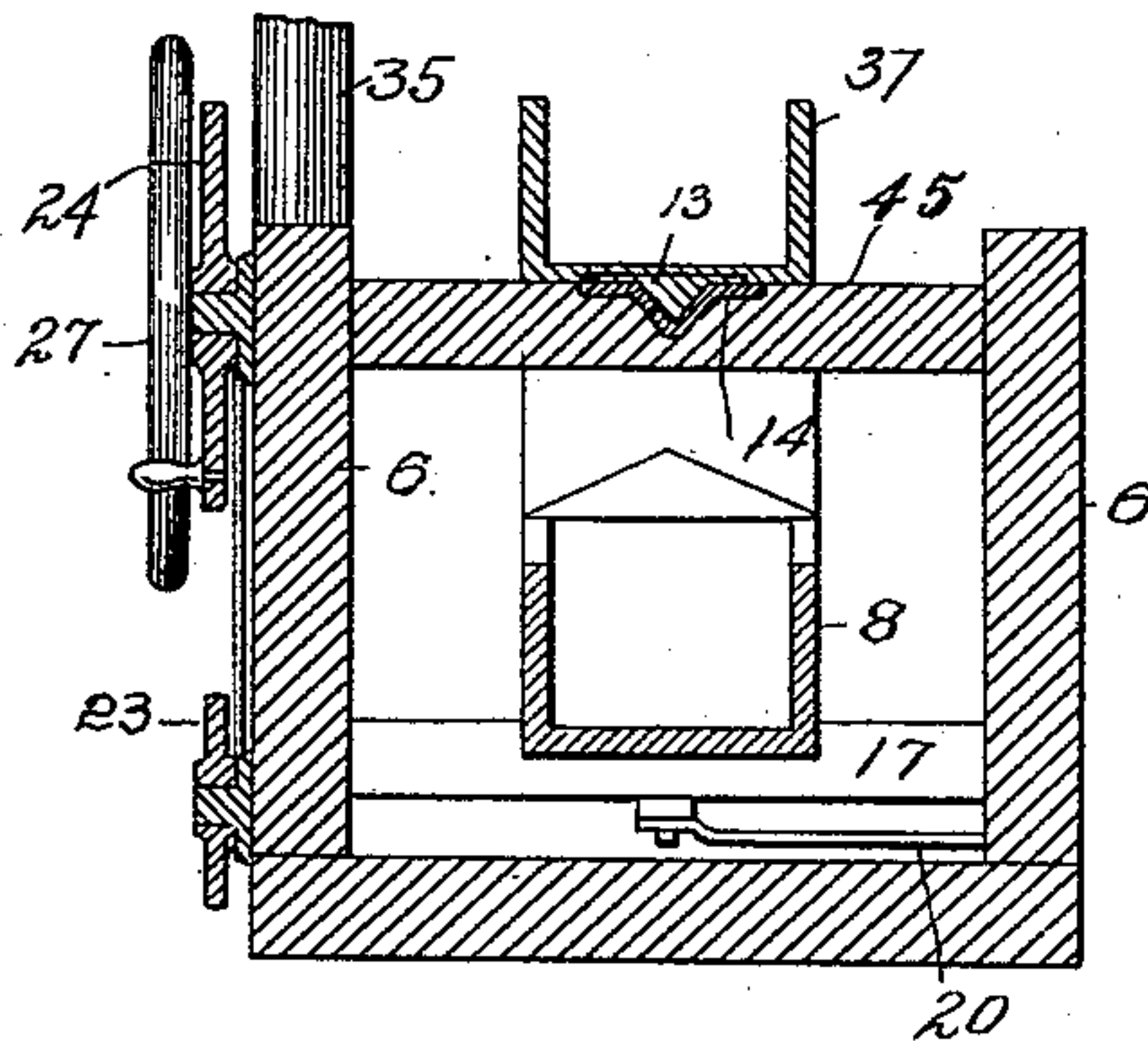


Fig. 6.

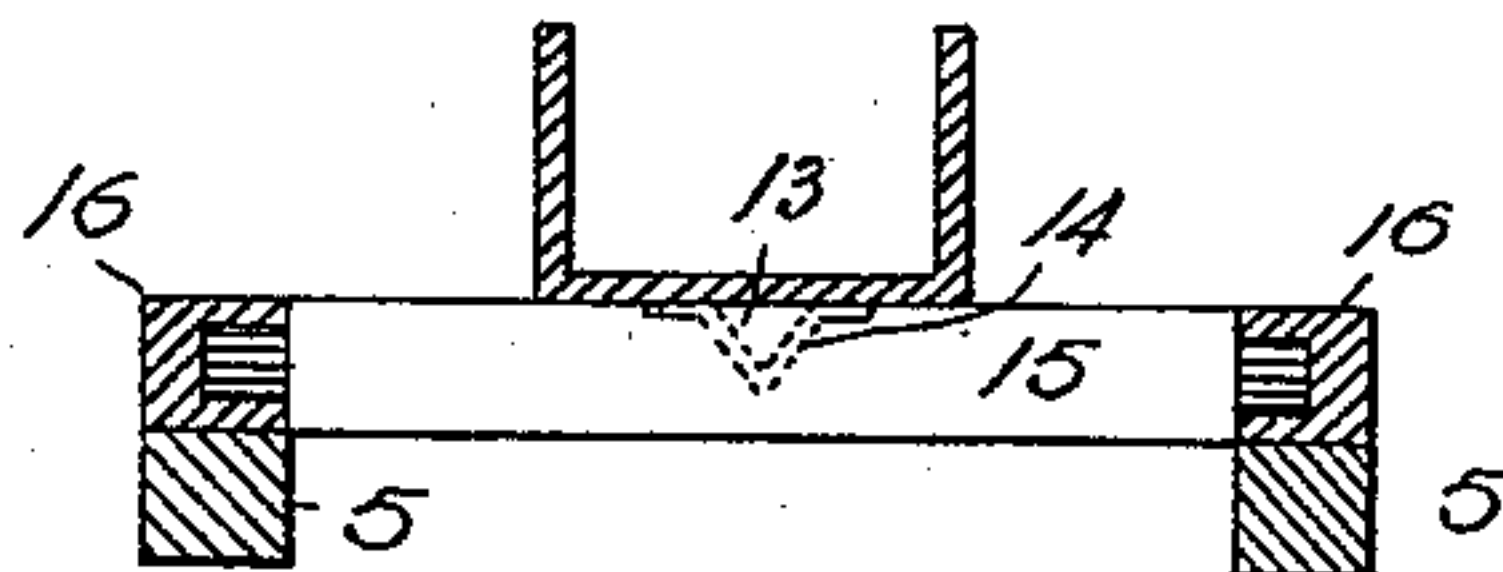


Fig. 7.

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(No Model.)

3 Sheets—Sheet 3.

U. S. GRANT.  
CONCENTRATOR.

No. 539,990.

Patented May 28, 1895.

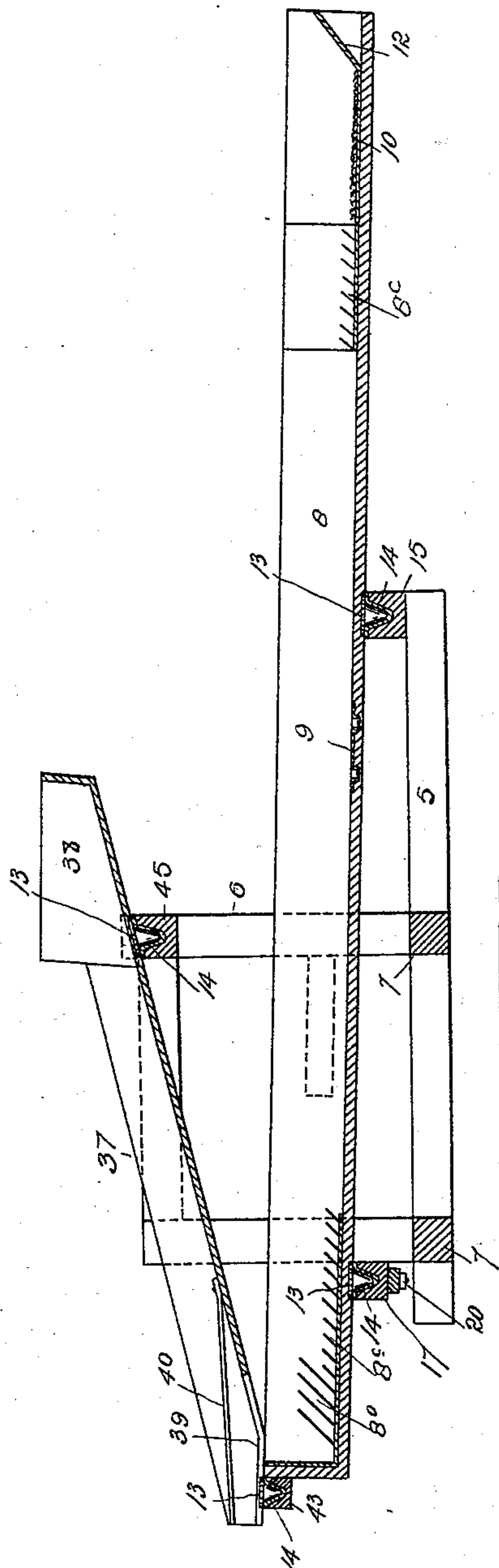


Fig. 8.

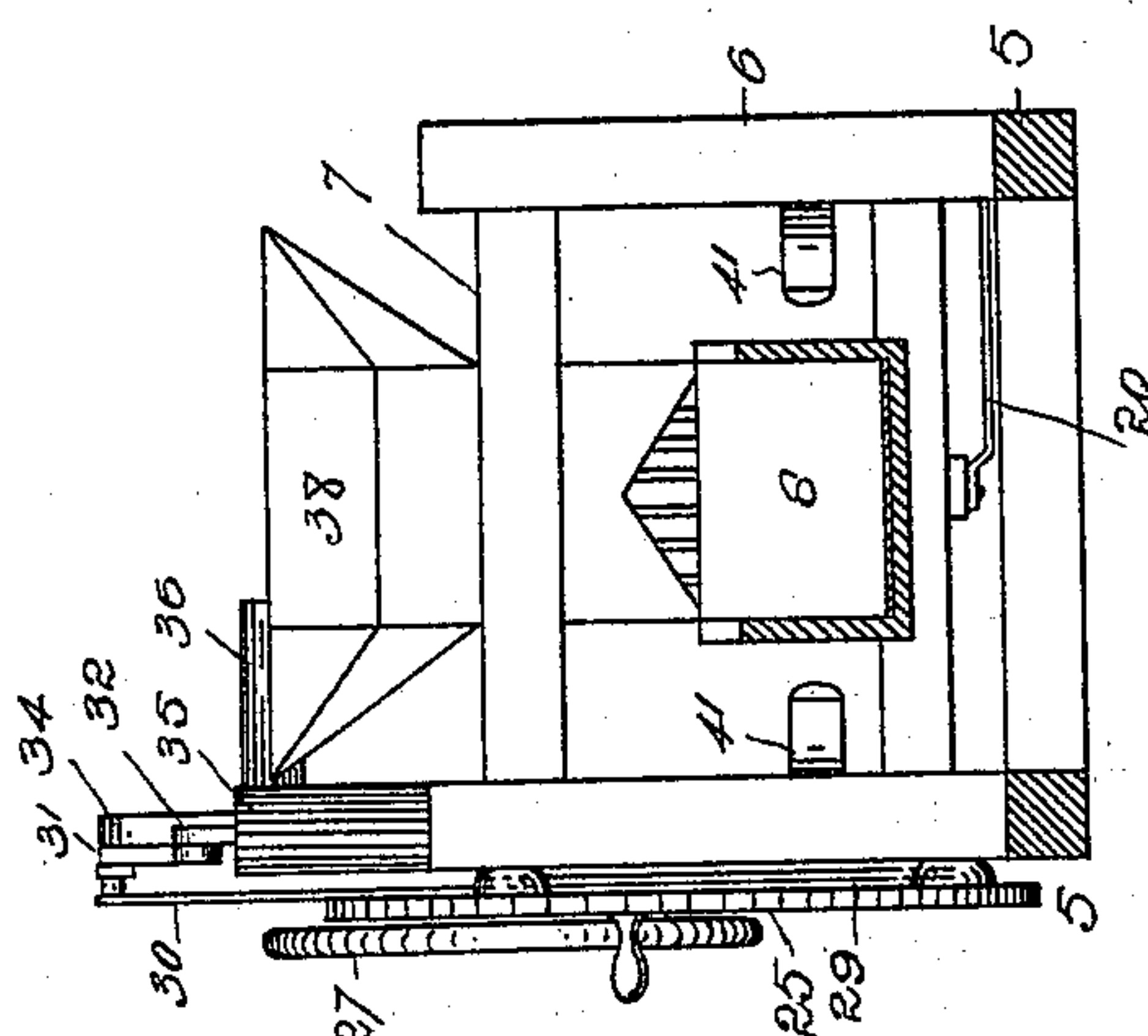


Fig. 9.

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# UNITED STATES PATENT OFFICE.

ULYSSES STEPHEN GRANT, OF DENVER, COLORADO.

## CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 539,990, dated May 28, 1895.

Application filed July 20, 1894. Serial No. 518,072. (No model.)

*To all whom it may concern:*

Be it known that I, ULYSSES STEPHEN GRANT, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in 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 concentrators, specially designed for use in treating placer material, or dirt carrying free gold; and the same consists of the features, arrangements and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of the machine, partly in section. Fig. 2 is a top or plan view thereof. Fig. 3 is a plan view with the concentrating box or trough removed. Fig. 4 is a front end view partly in section and partly broken away. Fig. 5 is a section taken on the line  $x x$ , Fig. 1. Fig. 6 is a section taken on the line  $y y$ , Fig. 1. Fig. 7 is a perspective view in detail, on an enlarged scale, of the counterpart plates forming a pivotal connection between parts of the mechanism at several points. Figs. 8 and 9 are longitudinal and cross-sectional elevations respectively of the machine.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate the base of the stationary frame to which are attached vertical bars 6 connected by horizontal side bars 7.

The concentrating box or trough 8 is a long, narrow structure supported upon the framework of the machine in such a manner as to have a lateral or panning movement upon a central pivot. The front end of this trough, or that which receives the material to be treated, is provided with riffles 8<sup>a</sup> and 8<sup>c</sup>. The riffles 8<sup>a</sup> are higher than the riffles 8<sup>c</sup>, the higher riffles being located at the end of the box, into which the material is discharged

from the hopper-chute. As there is considerable agitation resulting from the falling of the sand and dirt mingled with the water, the riffles 8<sup>a</sup> are made higher than the other riffles to prevent the nuggets being carried over the riffles at this particular part of the trough. The central portion of the trough is provided with a metal plate 9 set into its bottom and provided with pockets for catching the mineral which settles in the pockets by reason of eddies formed therein by the passing current of pulp. Near the tail of the box is located another set of riffles 8<sup>c</sup>; while at this extremity of the trough, or just beyond this last named set of riffles, is placed a matting 10 of sheep skin with the wool on, or some similar material, the function of which is to catch the fine gold which may be carried to this end of the machine.

The trough 8 terminates at the tail in an inclined plate 12 which projects upward from the bottom thereof, occupying an angle of, say forty-five degrees, more or less. This trough 8 stands at an inclination, whereby the pulp travels from the head to the tail when the machine is in operation. The movement of the pulp from one end to the other of the trough may be regulated by changing the inclination thereof, which can be readily accomplished. At a suitable point on the under surface of the trough is made fast a plate 13 carrying a depending lug or projection, preferably cone-shaped, and engaging a counterpart socket in another plate 14 made fast to a bar 15 journaled in blocks 16 secured to the base of the framework.

As shown in the drawings, the bar 15 is located somewhat to the rear of the center of the trough, while the trough is further supported near its head by a bar 17 to which is attached another plate 14 having a socket for the reception of the lug of a plate 13 made fast to the bottom of the trough.

It will be observed that the connection between the trough and the bars 15 and 17 is substantially the same, the plates which form this connection being illustrated in detail in Fig. 7. It is preferred that the lug or projection on plate 13 should be somewhat longer than the depth of the socket in the plate 14 whereby the friction is reduced to a minimum by keeping the plates separated.



The extremities of the bar 17 are rounded to engage eyes formed at the lower extremities of the metal straps 19 whose upper extremities are pivoted on the rear vertical bars 6 of the stationary frame. These straps 19 are provided at their upper extremities with a series of apertures adapted to engage a pivot on the frame. By adjusting these straps, the inclination of the trough may be regulated as circumstances may require. The supporting bars 15 and 17 are preferably square or rectangular in cross-section, and are so placed that one of the flat sides of each bar engages the bottom of the trough. As the inclination of the trough is changed, these bars change by virtue of the construction of their extremities and engaging parts, whereby the engaging sides of the bars always maintain the same relation with reference to the bottom of the trough.

To the bottom of the bar 17 is movably attached one extremity of a rod 20, the opposite extremity being pivoted to one arm of a bell crank lever 21 fulcrumed on the base of the framework, the opposite arm being connected with a pitman 22 attached to a sprocket wheel 23 journaled in the framework and actuated from the sprocket wheel 24 provided with a suitable crank. A chain 25 engages the sprockets 23 and 24 and another small sprocket 26 on the hub of a fly wheel 27. A pitman 28 is also attached to the sprocket wheel 23, its opposite extremity being connected with one arm of a bell crank lever 29 fulcrumed on one of the bars 7 of the framework, its other arm being movably connected with a rod 30 whose opposite extremity is connected with the walking beam 31 whose extremities are connected with the piston stems 32 of the pump cylinders 33. The walking beam is fulcrumed on a suitable support 34 mounted in the stationary framework of the machine. The piston cylinders 33 are connected with hose pipes 35 connected with any suitable water supply source. From the cylinders 33 lead discharge spouts 36 (see Fig. 3) to the feed chute 37 connected with the hopper 38. This feed chute is placed at a suitable inclination. Its upper extremity is connected with the hopper, and its lower extremity is provided with a V-shaped opening 39 covered by grate bars 40 which reject the coarser part of the rock and gangue thrown into the hopper.

The rear bars 6 of the stationary frame are provided with spring bumpers 41 adapted to engage the sides of the trough during the operation of the machine.

The machine, as shown in the drawings, is set in motion by turning the crank wheel 24. It is evident, however, that the machine may be operated from any suitable motor by placing a pulley on the shaft of the crank wheel and connecting the pulley with the motor by means of a belt. The movement of the crank wheel imparts a lateral oscillation to the trough through the medium of the chain 25, the sprocket wheel 23, the pitman 22, the bell

crank lever 21 and the connecting rod 20. As the trough moves, the center of oscillation is where the lug 13 engages the socket 14.

The lower extremity of the chute 37 rests upon the head of the trough, and is movably connected therewith by means of a plate 13 on the chute engaging a socket plate 14 attached to a bar 43 secured to the head of the trough. This connection is indicated by dotted lines in Fig. 4, and is the same as that illustrated in Fig. 7, and heretofore described. The upper part of the chute is similarly connected (see Fig. 5) with a transverse bar 45 connecting two of the vertical bars 6 of the framework. Hence as the trough moves, a similar movement is imparted to the hopper and chute.

The material to be treated is fed to the hopper and chute, and passes thence through the grate bars 40 and the opening 39 to the riffles 8<sup>a</sup>, or head extremity of the trough 8, the necessary water being pumped into the chute through the instrumentality of the mechanism heretofore described. The mineral is separated from the gangue in the trough, the coarser portion of the gold being caught by the riffles 8<sup>a</sup> and 8<sup>b</sup> at the head of the trough, the medium sized particles in the pockets of the plate 9, and the finest particles in the sheepskin matting 10.

In forming the connection between the chute 37 and the cross-bar 45 of the frame, the plate 13 is adjustably attached to the bottom of the chute in order to allow the trough and chute to move in unison during the adjustment of the trough's inclination, since the extremities of the corresponding parts of the trough and chute describe different arcs during such adjustment.

Having thus described my invention, what I claim is—

1. In a concentrator, the combination with a suitable stationary framework, of the trough pivoted on the framework in such a manner that the trough is allowed a laterally oscillating movement, and a bar engaging the bottom of the trough at the pivotal point and having its extremities movably connected with the stationary frame, whereby the inclination of the trough may be changed without disengaging the pivot from its socket, or disturbing the pivotal connection of the trough with the frame, substantially as described.

2. In a concentrator, the combination with the stationary framework, of a laterally oscillating trough supported on the framework, a horizontal bar having its extremities movably connected with the stationary frame and engaging the bottom of the trough which is pivoted on the bar by means of a lug or projection on one part engaging a socket in the other part, another bar pivotally connected with the bottom of the trough, and supporting straps adjustably connected with the stationary frame and movably attached to said bar, substantially as described.

3. In a concentrator, the combination with



5 a suitable stationary framework, of the trough  
pivoted on the framework in such a manner  
that it is allowed a laterally oscillating move-  
ment, a bar engaging the bottom of the trough  
at the pivotal point and having its extremi-  
ties movably connected with the stationary  
frame, and an inclined feed chute movably  
connected with the frame at its upper ex-  
tremity and having its lower extremity mov-  
ably connected with the upper extremity of  
the trough into which it discharges, substan-  
tially as described.

15 4. In a concentrator, the combination with  
a suitable stationary framework, of the trough  
pivoted on the framework in such a manner  
that the trough is allowed a laterally oscillat-  
ing movement, a bar engaging the bottom of  
the trough at the pivotal point and having its

extremities movably connected with the sta-  
tionary frame, and an inclined feed chute 20  
movably connected with the frame at its up-  
per extremity and having its lower extremity  
movably connected with the upper extremity  
of the trough into which it discharges, the up-  
per extremity of the feed chute being pro- 25  
vided with a hopper and the lower extremity  
having an opening above the head of the  
trough, said opening being covered by grate  
bars, substantially as described.

In testimony whereof I affix my signature 30  
in the presence of two witnesses.

ULYSSES STEPHEN GRANT.

Witnesses:

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CHAS. E. DAWSON.