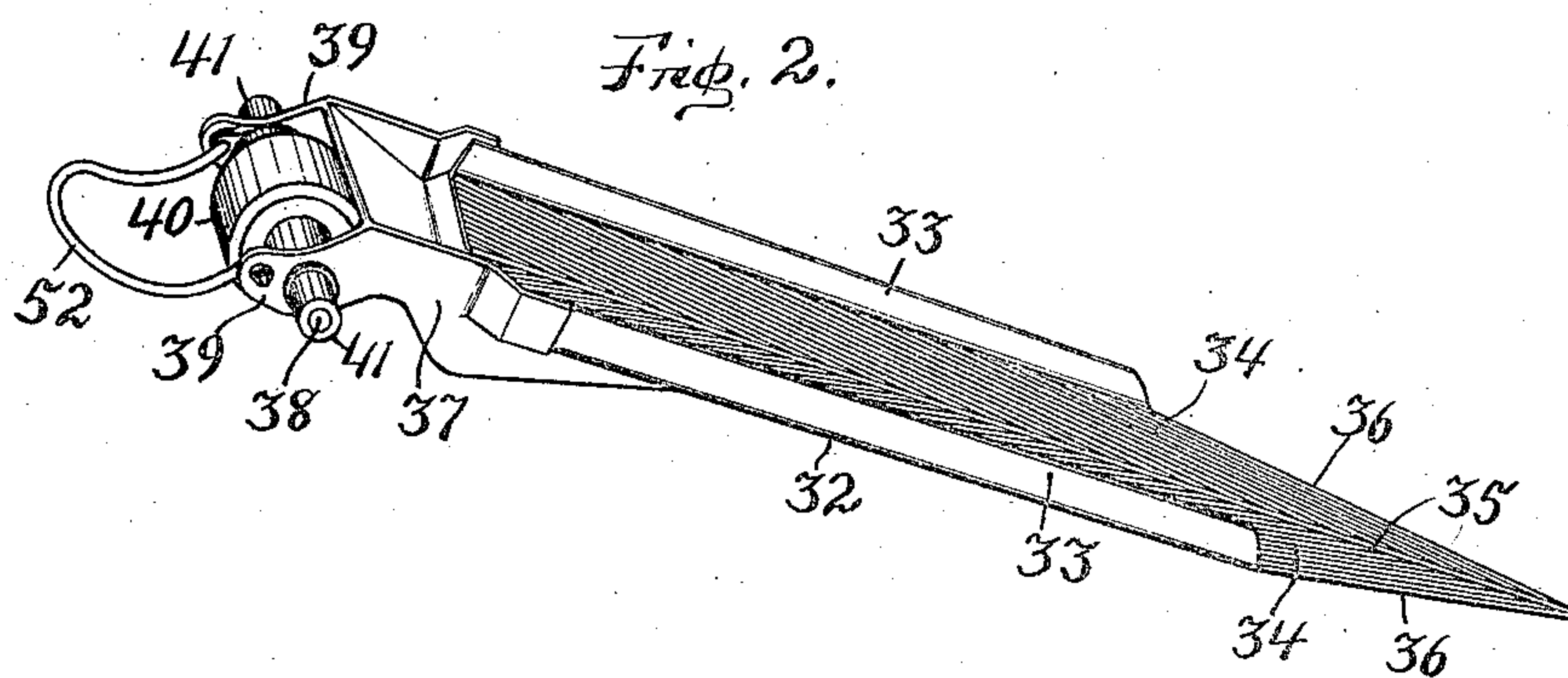
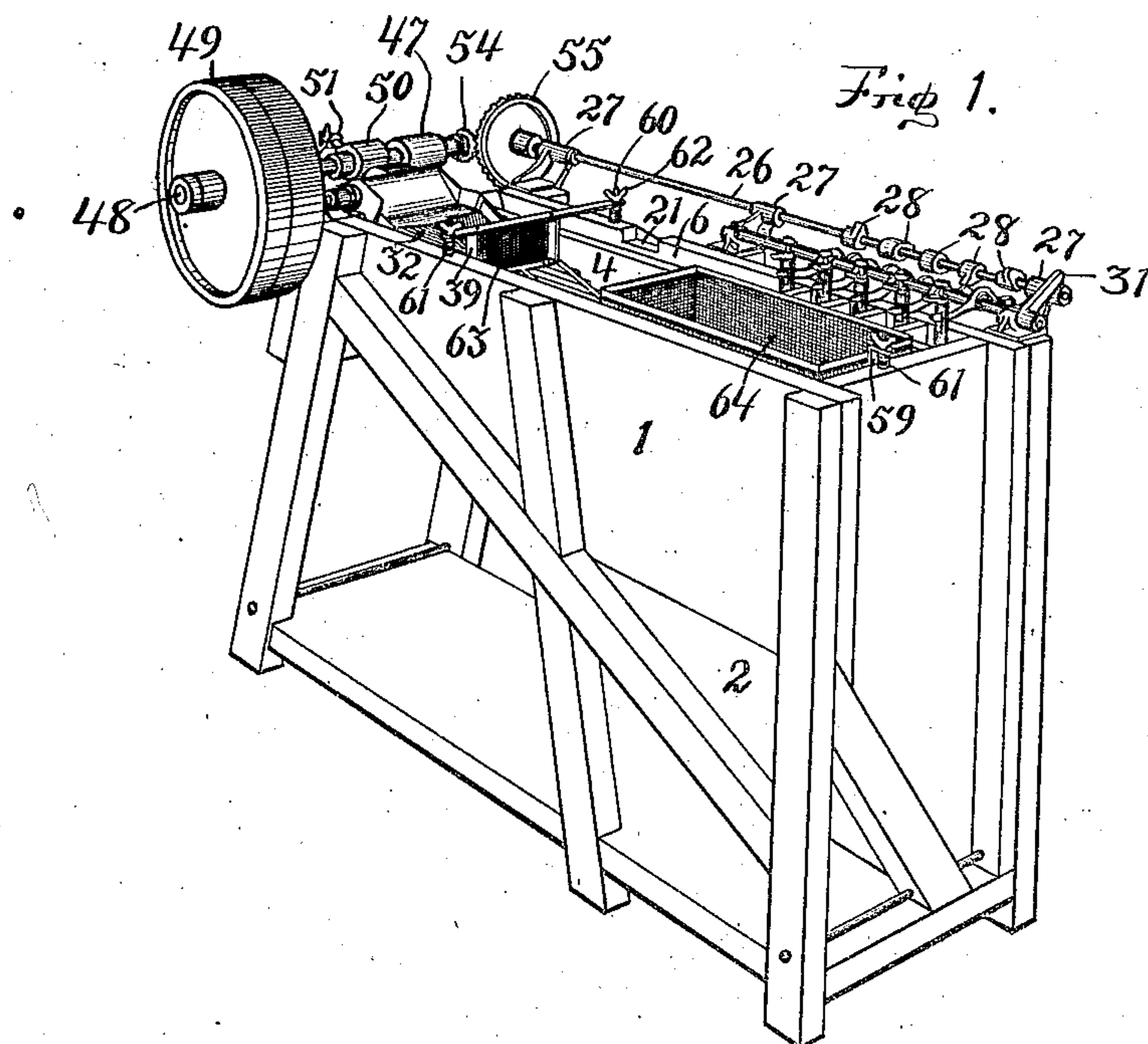


No. 810,847.

PATENTED JAN. 23, 1906.

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ORE CONCENTRATOR.
APPLICATION FILED FEB. 4, 1905.

4 SHEETS—SHEET 1.



WITNESSES:

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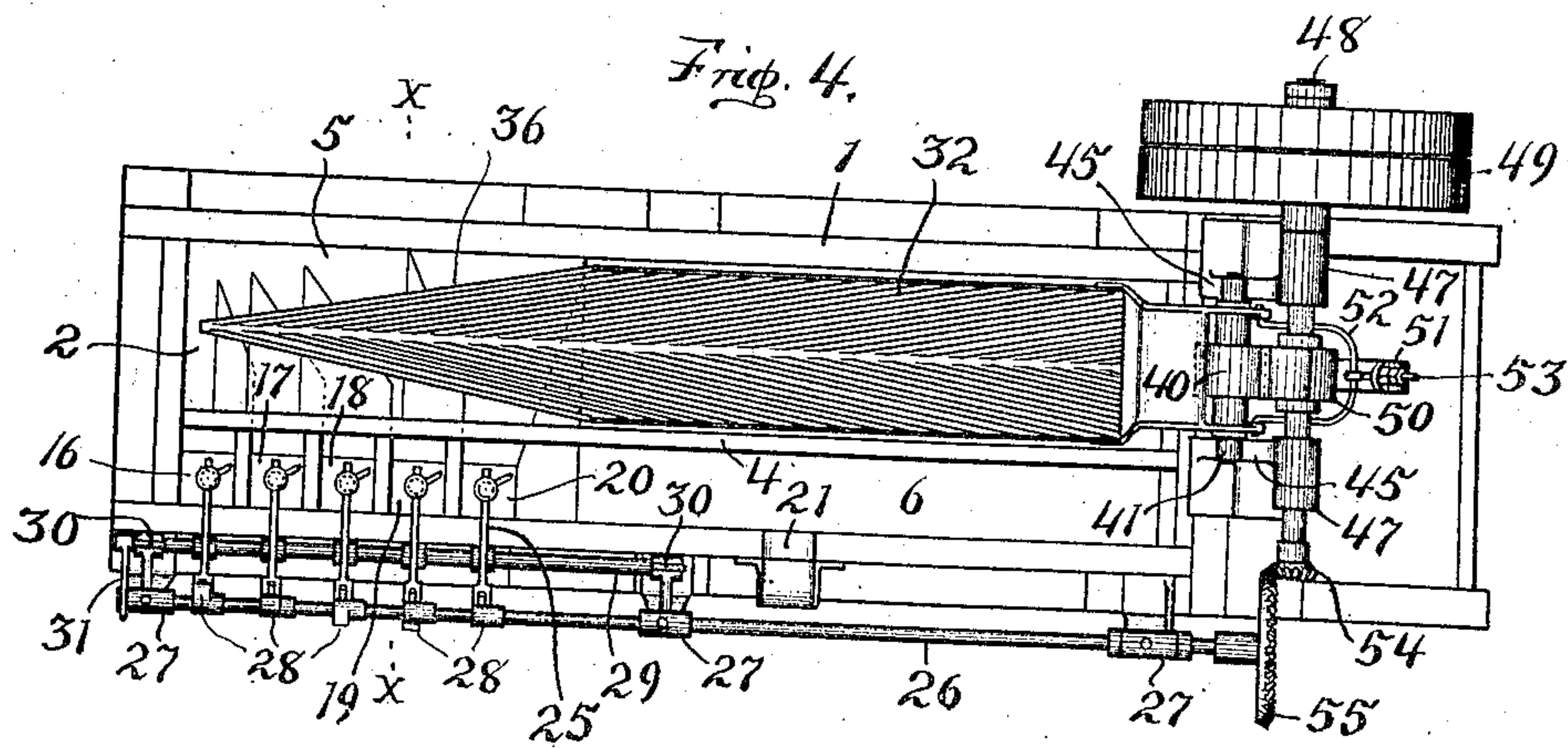
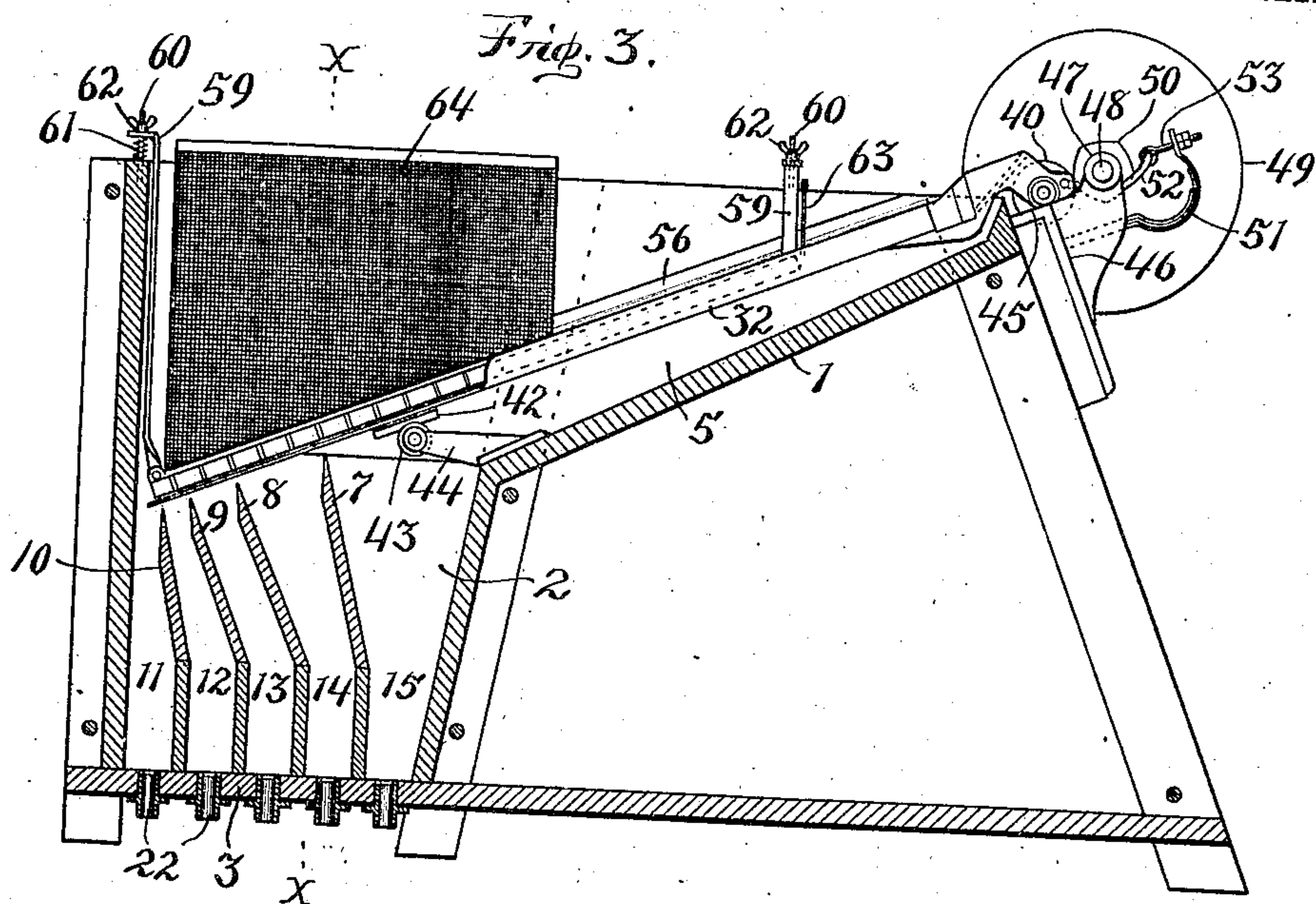
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4 SHEETS—SHEET 2.



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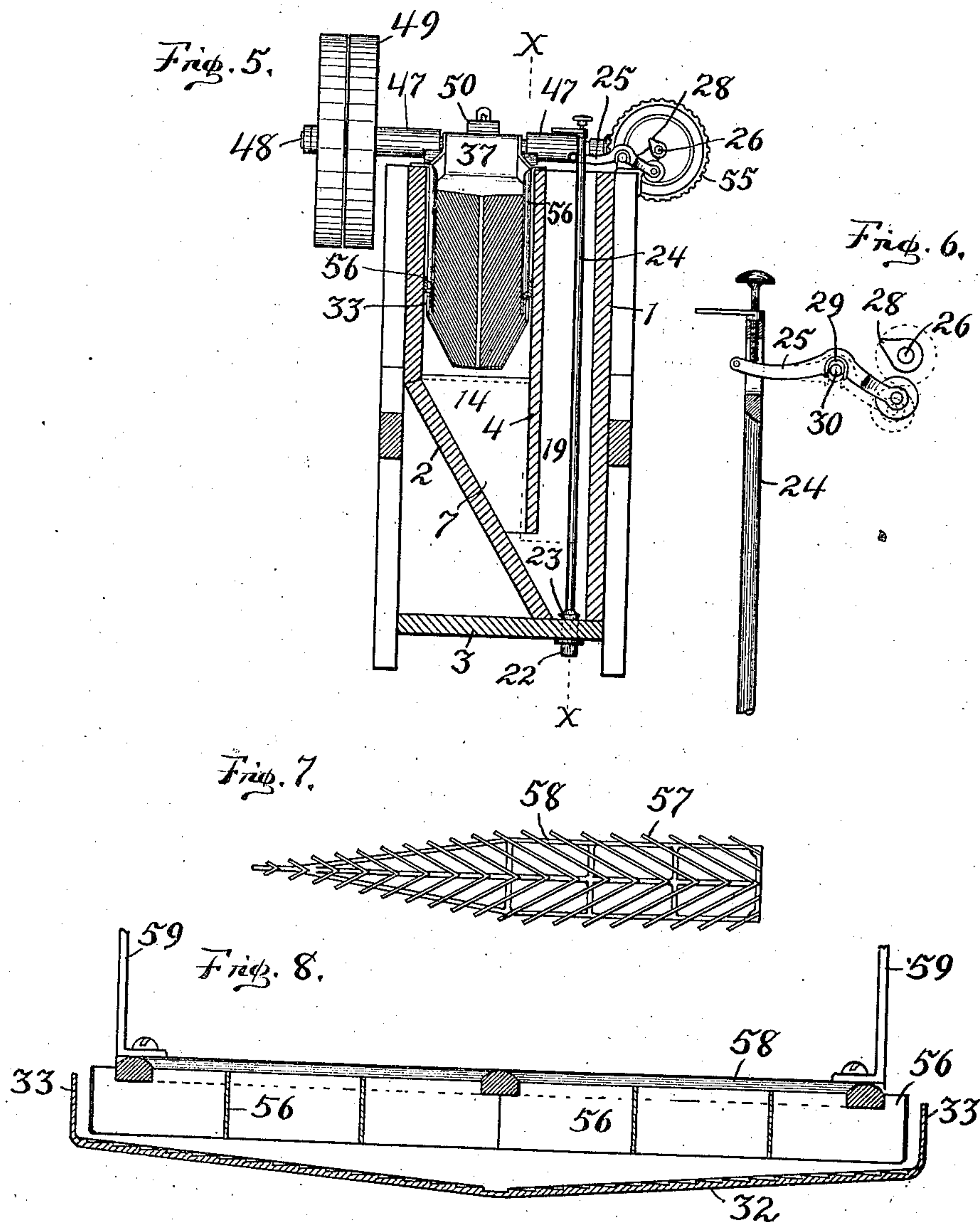
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4 SHEETS—SHEET 3.



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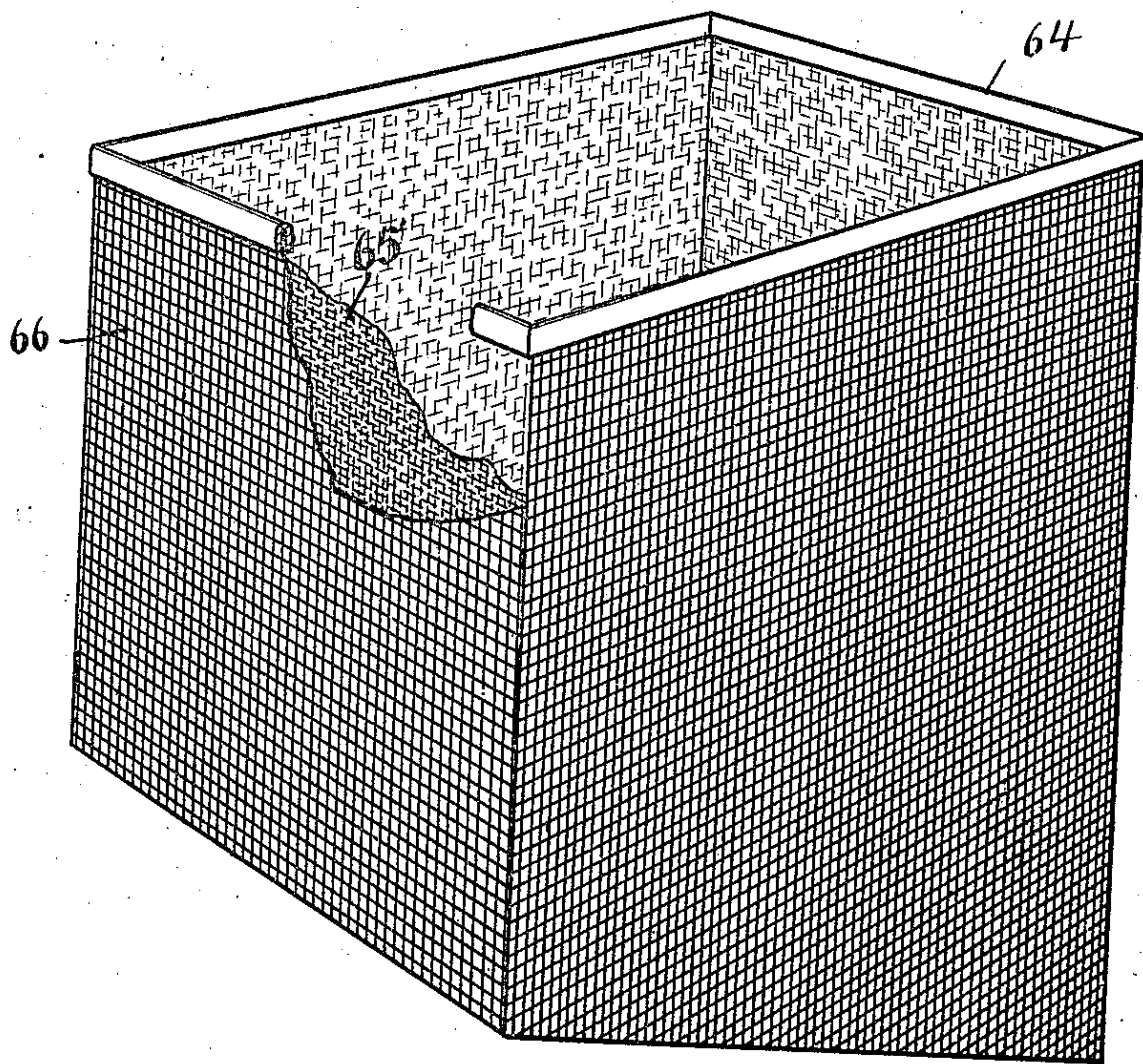
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Fig. 9.



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UNITED STATES PATENT OFFICE.

EMIL DEISTER, OF FORT WAYNE, INDIANA.

ORE-CONCENTRATOR.

No. 810,847.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed February 4, 1905. Serial No. 244,234.

To all whom it may concern:

Be it known that I, EMIL DEISTER, a citizen of the United States of America, and a resident of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Ore-Concentrators, of which the following is a specification.

This invention relates to improvements in ore-concentrators; and the object thereof is to provide a machine in which separation of mineral values from ore-pulp will take place without serious loss of fines ordinarily caused by running wash-water.

The foregoing object is accomplished by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the invention. Fig. 2 is a perspective view of the concentrating-pan. Fig. 3 is a side view of the machine, shown in section on the line $x x$ of Fig. 5, parts of which are not shown in section. Fig. 4 is a plan of the machine with parts comprising the diffusion-box, screen, and diverting-blades omitted. Fig. 5 is a transverse section of the machine on the line $x x$ of Figs. 3 and 4. Fig. 6 is a detail showing the construction and arrangement of the actuating mechanism for operating the discharge-valves. Fig. 7 is a bottom plan of the diverting-blades and frame. Fig. 8 is a central cross-sectional view of the concentrating-pan and diverting-blades. Fig. 9 is a detail perspective view showing the construction of the diffusion-box.

Similar numerals of reference indicate corresponding parts throughout the several views.

1 is a stationary tank having an open top. The lower part 2 of one side of said tank slants inwardly toward the bottom 3, and a partition 4 is secured in said tank to divide it into two longitudinal compartments 5 and 6. The lower part of the compartment 5 has transverse partitions 7, 8, 9, and 10 arranged therein, which afford receptacles 11, 12, 13, 14, and 15, and the latter communicate beneath the lower edge of the partition 4 with corresponding receptacles 16, 17, 18, 19, and 20, respectively. It will now appear that matter settling in the respective receptacles of the compartment 5 will gravitate therefrom into the corresponding receptacles of the compartment 6. An overflow-outlet 21 leads from the compartment 6 near the top

thereof. A series of discharge-spouts 22 lead through the bottom 3 of the tank, one from each of the receptacles 16, 17, 18, 19, and 20, and each of said discharge-spouts is provided with a valve 23, which is seated upon the top thereof. The stem 24 of each of said valves extends vertically in its corresponding receptacle, and the upper end of each of said stems has connection with an actuating-lever 25, which is adapted to raise the corresponding valve by lifting its stem. The valve-stem is of sufficient weight as to return the valve to its seat when released by said lever. A valve-actuating shaft 26 is rotatively mounted in suitable brackets 27, which extend from the side of the tank 1, at the top thereof, and upon said shaft are secured a series of cams 28, which engage correspondingly the levers 25 and actuate the same. The said cams are so disposed relative to one another that said levers will become actuated in successive order when the shaft 26 is rotated. The levers 25 are mounted upon a supporting-shaft 29, which has end trunnions 30 eccentrically disposed. The said trunnions rest in the adjacent brackets 27, and one of said trunnions has fixed upon its extending end a hand-lever 31, by means of which the shaft 29 may be turned, whereby all of the said levers 25 will be raised or lowered, according to the position of said hand-lever, and thus said levers may be brought into or out of position for engagement with the cams 28, as shown in Fig. 6.

In the upper part of the tank 1 and within the compartment 5 thereof is arranged upon an incline a concentrating-pan 32, which is mounted so as to permit of its being reciprocated. The said pan consists of a thin metal plate slightly depressed throughout its length and has upturned sides 33 and two series of riffles 34 upon its upper surface. The said riffles lead uniformly from the sides of the pan diagonally downward and terminate at points near the middle thereof, leaving a central passage-way 35 throughout the length of the pan. The lower or discharge part of the pan is without upturned sides, and the edges 36 thereof converge to a point. A head-casting 37 is rigidly fixed to the upper part of the concentrating-pan and has loosely mounted therein a shaft 38, the ends of which project from each side of said casting. Upon said shaft and between the wings 39 of said casting is mounted a bearing-roller 40,

and upon said extending ends of said shaft are loosely mounted the respective supporting-rollers 41. To the under side of the lower part of the concentrating-pan is secured a guide-bearing 42, which rests upon a grooved wheel 43, supported in the tank 1 by the bracket 44. The said supporting-rollers 41 rest upon guideways 45, afforded by the main bracket 46. The said guideways range in a plane parallel with that of the concentrating-pan 32, so that when the pan is actuated it will be reciprocated in the direction of its length. The main bracket 46 has bearings 47, in which is mounted the driving-shaft 48, which has in connection therewith suitable tight and loose belt-pulleys 49, by which the same is driven. Between the bearings 47 upon said shaft 48 is mounted a polygonal driving-cam 50, which acts against the said bearing-roller 40 when the driving-shaft revolves. A tension-spring 51 is fixed upon the main bracket 46, and a yoke 52 is secured to the wings 39 of the head-casting of the concentrating-pan, and an adjustable connection is made between said yoke and spring by means of the eyebolt 53. By this means the roller 40 is held against the cam 50 with more or less force accordingly as the eyebolt 53 is adjusted in the upper end of the spring 51, and because of the tension of the spring the concentrating-pan tends toward its uppermost plane of movement. As the cam 50 revolves the concentrating-pan will be rapidly vibrated in the direction of its length.

Upon one end of the driving-shaft 48 is fixed a bevel-pinion 54, which meshes with a bevel-gear 55, mounted upon the end of the valve-actuating shaft 26, by means of which motion is imparted to the latter.

Aprons 56 are secured within the compartment 5, respectively to the tank 1 and partition 4, adjacent the sides of the concentrating-pan, and the lower edges of said aprons overlap the upturned edges 33 of the pan and serve to direct settling matter onto the concentrating-surface of the pan.

A series of diverting-blades 57 are secured to a suitable frame 58 and are V-shaped and are arranged uniformly. The vertices of said diverting-blades are located in line with the middle of said frame, and the sides thereof range divergently to points slightly beyond the sides of said frame. The said series of diverting-blades and their supporting-frame are made to conform in outline with the general plan of the concentrating-pan, and when placed in position over the pan the said diverting-blades range oppositely to the riffles 34, viz: The said riffles converge toward the center of the pan, and the diverting-blades diverge toward the sides thereof. The said diverting-blades are supported by means of suitable hangers 59, secured, respectively, at the ends of the frame 58, and

said hangers have connection with studs 60, which project vertically from the top of the tank 1, and upon which said hangers are vertically adjustable by means of suitable springs 61 and thumb-nuts 62.

A screen 63 is arranged transversely in the compartment 5 and ranges in a vertical plane adjacent the hangers 59 at the upper end of the diverting-blades, and the lower edge of the screen extends approximately even with the tops of the adjacent ends of the diverting-blades.

64 is a diffusion-box having an inclined bottom and an open top. The sides, ends, and bottom of said box are composed of bur-laps 65 or other suitable fabric, suitably reinforced by wire-gauze 66 for the purpose of support. The said box 64 rests upon the top of the frame 58 of the diverting-blades and over the lower or discharge part of the concentrating-pan.

In the operation of this invention the tank is filled with water to the level of its overflow-outlet, and such level is constantly maintained by supplying a suitable quantity of water to the diffusion-box. The water thus supplied seeps outward through the sides, ends, and bottom of the diffusion-box, and thus the necessary supply of water to the tank is effected without causing currents which would disturb the ore matter passing over the concentrating-pan. While the concentrating-pan is in motion ore-pulp is suitably fed to the machine directly upon the upper part of the pan at a point between the screen 63 and the head-casting 37. The pulp thus fed settles upon the pan and moves toward the discharge end because of the rapid vibration and the incline of the concentrating-pan rather than because of any movement of the water contained in the tank. It is the intention that the water in the tank shall be at all times as motionless as possible. During the passage of ore-pulp down the inclined pan the values or mineral portion of the pulp will gravitate and form a stratum next the surface of the pan and will be directed by the convergent riffles toward the central passage-way 35, and the overlying portion of the pulp, which has thus been relieved of its mineral contents, will be directed toward the sides of the pan. In this manner the values are carried to the extreme end of the pan, and the more or less valueless gangue is caused to pass over the convergent edges 36 thereof. The values discharged from the pointed end of the pan gravitates therefrom into the receptacle 11 and passes into the receptacle 16, from whence it is discharged through the spout 22 in the bottom thereof when the corresponding valve is lifted. The ore matter discharged from the edges 36 of the pan gravitates into the receptacles 12, 13, 14, and 15, from whence it passes into the corresponding receptacles 17, 18, 19, and 20 and is discharged therefrom

through the spouts in the bottoms thereof as the corresponding valves are lifted. The proportion of ore matter discharged from the extreme point of the pan may be varied directly by raising the diverting-blades and conversely by lowering the same.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

10 1. An ore-concentrator comprising a stationary tank adapted to hold a body of water; and a concentrating-pan having upturned sides at its upper portion and convergent edges at its discharge end, and having
15 also riffles upon its concentrating-surface which converge toward its discharge end, the said pan being arranged in the tank with its concentrating-surface beneath the level of water contained therein, and being adapted
20 to be reciprocated in line with the plane of its concentrating-surface.

2. An ore-concentrator comprising a stationary tank adapted to hold a body of water; and a concentrating-pan having upturned sides and with convergent edges at its
25 discharge end, and having also a series of riffles which converge toward its discharge end, and a central longitudinal channel, the said pan being arranged in the tank with its concentrating-surface beneath the level of water
30 contained therein and being adapted to be reciprocated in line with the plane of its concentrating-surface.

3. An ore-concentrator comprising a stationary tank adapted to hold a body of water; a concentrating-pan having convergent
35 edges at its discharge end, arranged in the tank with its concentrating-surface beneath the level of water contained therein, and being adapted to be reciprocated in line with the plane of its concentrating-surface; and a series of divergent diverting-blades suspended
40 over the pan and being adapted to direct overlying ore matter toward its edges.

4. An ore-concentrator comprising a stationary tank adapted to hold a body of water; a concentrating-pan the edges of which
45 converge near the discharge end thereof, arranged in the tank with its concentrating-surface beneath the level of water contained therein and being adapted to be reciprocated in line with the plane of its concentrating-surface; a series of riffles on the pan which
50 converge toward its discharge end; a series of receptacles transversely disposed in the lower part of the tank beneath the convergent edges of the pan; and stationary diverting-blades to direct overlying ore matter toward the edges of the pan.

5. An ore-concentrator comprising a stationary tank adapted to hold a body of water; a concentrating-pan, the edges of which
60 converge at its discharge end, arranged in said tank with its concentrating-surface beneath the level of water contained therein,

and being adapted to be reciprocated in line with the plane of its concentrating-surface; stationary diverting-blades above said pan, adapted to divert overlying ore matter toward the sides of said pan; receptacles in
70 said tank beneath said pan, adapted to receive ore matter respectively from said convergent edges and discharge end of said pan; and mechanism to actuate said pan.

6. An ore-concentrator comprising a stationary tank having two compartments and
75 adapted to hold a body of water; a number of receptacles in each of said compartments, the receptacles of one compartment communicating with the corresponding receptacles of the other compartment; a reciprocating concentrating-pan arranged in one of said compartments beneath the level of water contained therein, and with its discharge end extending over the receptacles of the corresponding compartment; and a series of
85 diverting-blades in stationary relation with the tank and being adapted to direct overlying ore matter from said pan into said receptacles.

7. An ore-concentrator comprising a tank; a reciprocating concentrating-pan submerged
90 in the tank and having a slight depression throughout its length; and a series of stationary diverting-blades arranged above the pan and which diverge toward the sides thereof.

8. An ore-concentrator comprising a tank; a reciprocating concentrating-pan submerged
in the tank and having riffles which converge toward its discharge end; and a series of stationary diverting-blades arranged above the pan and which diverge toward the sides thereof.

9. An ore-concentrator comprising a tank having a series of receptacles in the lower
105 part thereof; a reciprocating concentrating-pan arranged in said tank and having a pointed discharge end; and a series of divergent diverting-blades arranged over the pan and adapted to direct overlying ore matter from said pan into the foremost of said receptacles.

10. An ore-concentrator comprising a tank having a series of receptacles in the lower
part thereof; a reciprocating concentrating-pan arranged in said tank with its discharge end over said receptacles; a series of divergent diverting-blades arranged above the pan
115 and adapted to direct overlying ore matter from said pan into the foremost of said receptacles; and periodically-actuated outlet-valves located respectively in said receptacles.

11. An ore-concentrator comprising a tank; a reciprocating concentrating-pan in said
125 tank; a series of diverting-blades arranged over the pan and adapted to direct overlying ore matter toward the sides thereof; and a diffusion-box extending within the tank and located over the diverting-blades for supplying the tank with water.

12. An ore-concentrator comprising a tank adapted to hold a body of water and having a

series of receptacles in the lower part thereof; discharge-spouts leading respectively from said receptacles; a reciprocating concentrating-pan arranged in said tank with its discharge end over said receptacles, and having a series of riffles which converge toward its discharge end; a series of diverting-blades arranged over said pan, which diverge toward the sides thereof and are adapted to direct overlying ore matter therefrom into the foremost of said receptacles; and a diffusion-box extending within the tank and located over said diverting-blades for supplying said tank with water.

15 13. An ore-concentrator comprising a tank adapted to hold a body of water and having a series of receptacles in the lower part thereof; discharge-spouts, having valves in connection therewith, leading from said receptacles respectively; a reciprocating concentrating-pan arranged in said tank with its discharge end over said receptacles, and having riffles which converge toward its discharge end; and a series of diverting-blades adapted to direct overlying ore matter from said pan into the foremost of said receptacles.

14. In an ore-concentrator, a tank having a series of receptacles in its lower part, each of said receptacles having a discharge-spout; a concentrating-pan in said tank, adapted to discharge ore matter into said receptacles; a series of valves for the respective spouts of said receptacles; a corresponding series of levers in actuating relation with said valves; cams to actuate said levers; and an adjustable support for said levers to shift them into

or out of engaging position relative to said cams.

15. An ore-concentrator comprising a tank having a series of receptacles in the lower part thereof; a reciprocating concentrating-pan arranged in the tank with its discharge end over said receptacles, and having a series of riffles which converge toward its discharge end; a series of divergent diverting-blades arranged above the pan and adapted to direct overlying ore matter from the pan into the foremost of said receptacles; and periodically-actuated outlet-valves located respectively in said receptacles.

16. An ore-concentrator comprising a tank adapted to hold a body of water and having a series of receptacles in the lower part thereof; discharge-spouts leading respectively from said receptacles; a corresponding series of automatically-actuated valves for said spouts; a reciprocating concentrating-pan arranged in the tank with its discharge end over said receptacles, and having a series of riffles which converge toward its discharge end; and a series of diverting-blades arranged over the pan, which diverge toward the sides thereof and are adapted to direct overlying ore matter therefrom into the foremost of said receptacles.

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

EMIL DEISTER.

Witnesses:

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H. J. LAMPKE.