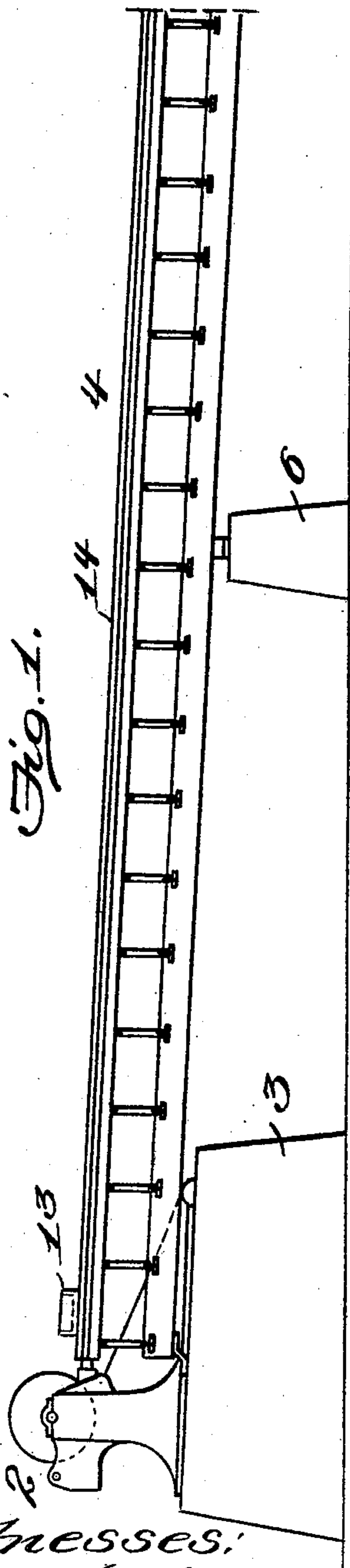


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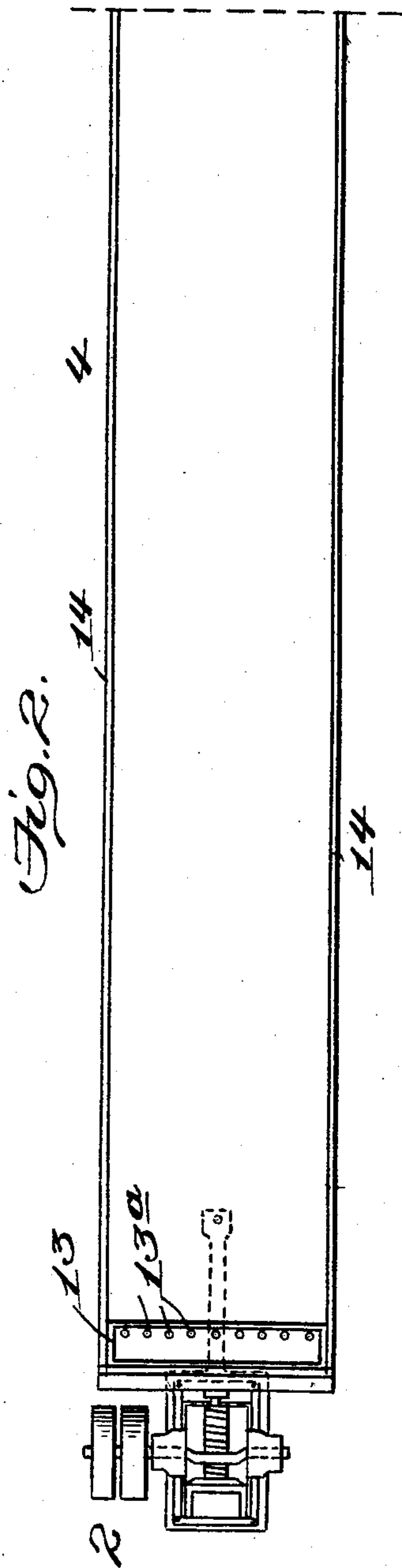
U. S. JAMES.
ORE CONCENTRATOR.
APPLICATION FILED NOV. 13, 1907.

Patented Aug. 30, 1910.

3 SHEETS—SHEET 1.



Witnesses:
C. D. Kester
J. B. Keeler

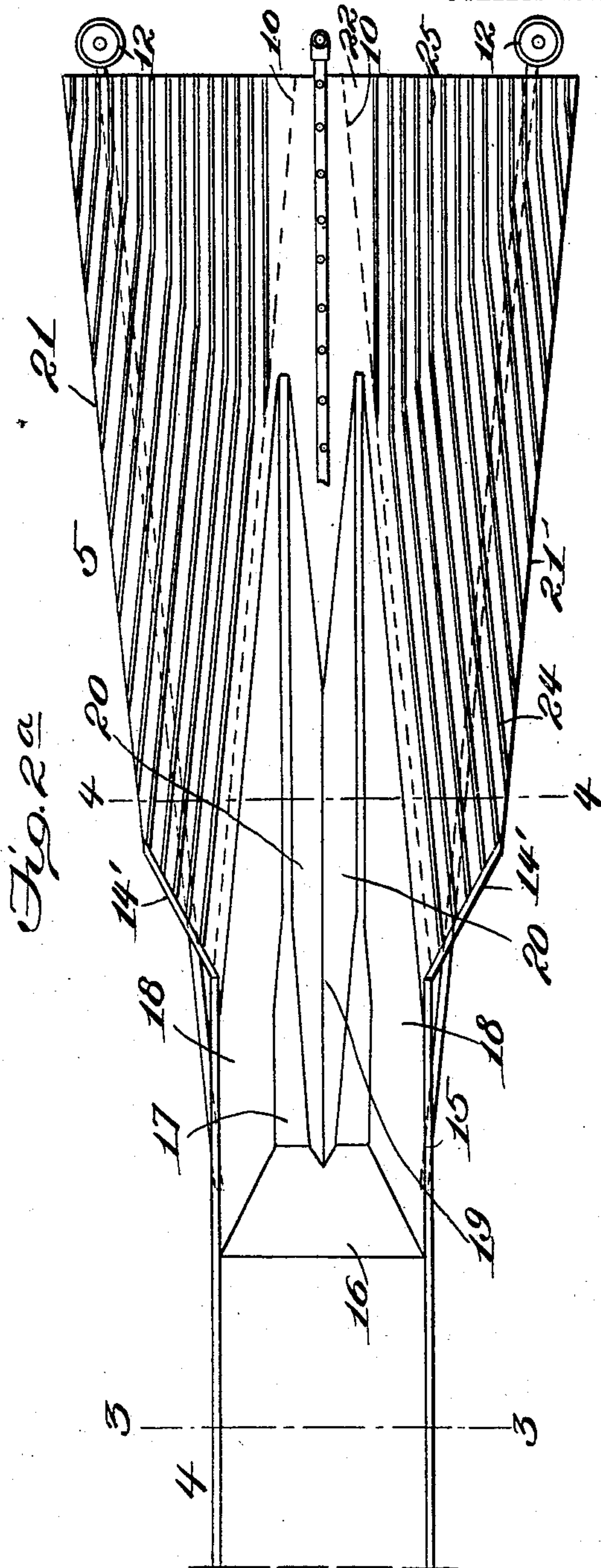
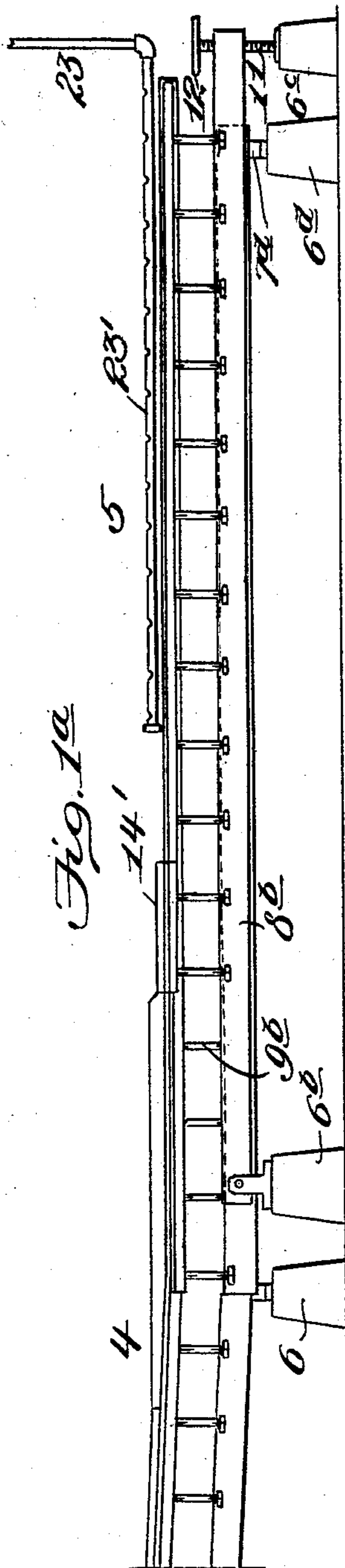


Inventor
Ulysses S. James
James L. Norris

Patented Aug. 30, 1910.

3 SHEETS—SHEET 2.

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Witnesses:
[Signature]
[Signature]

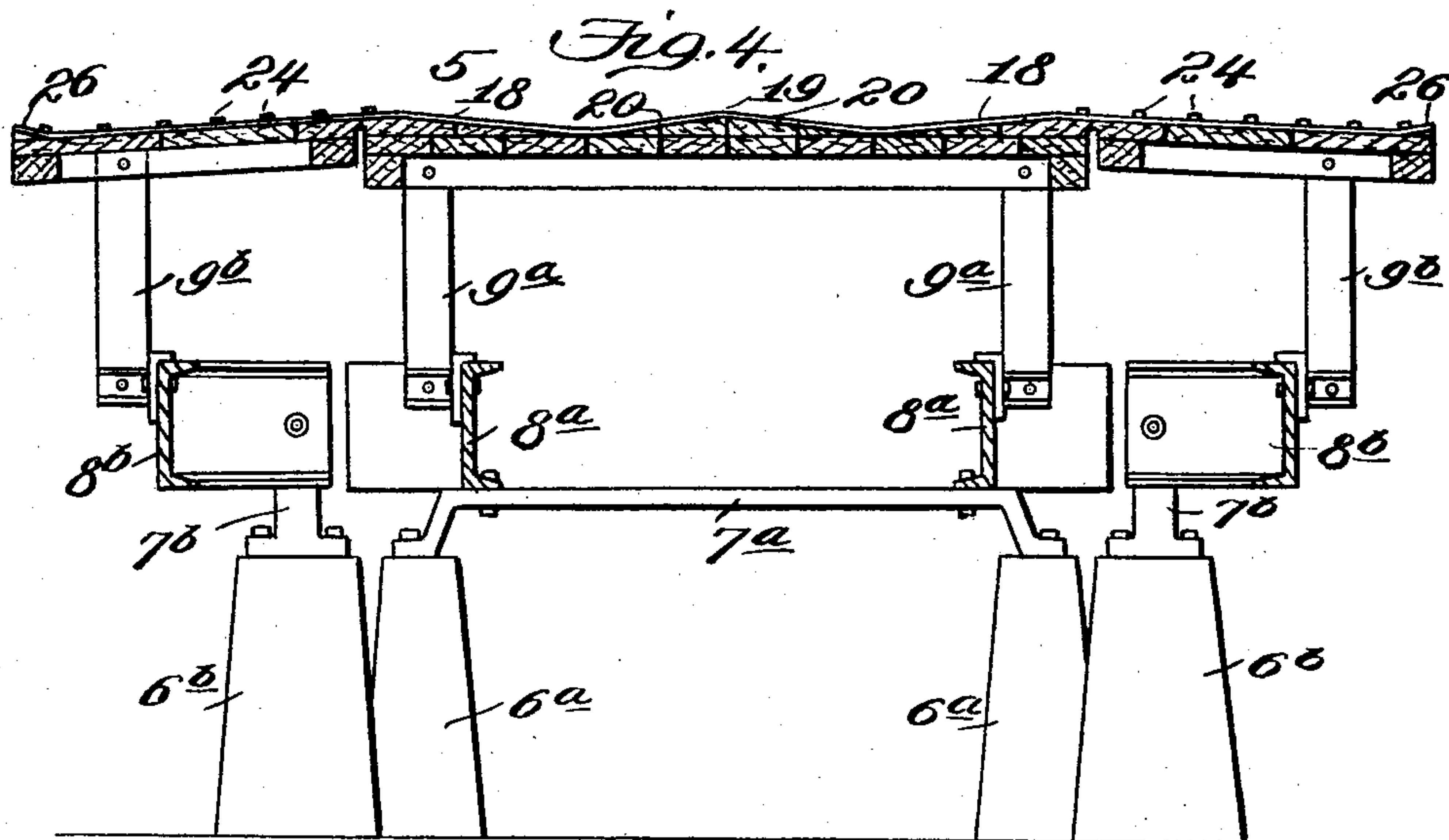
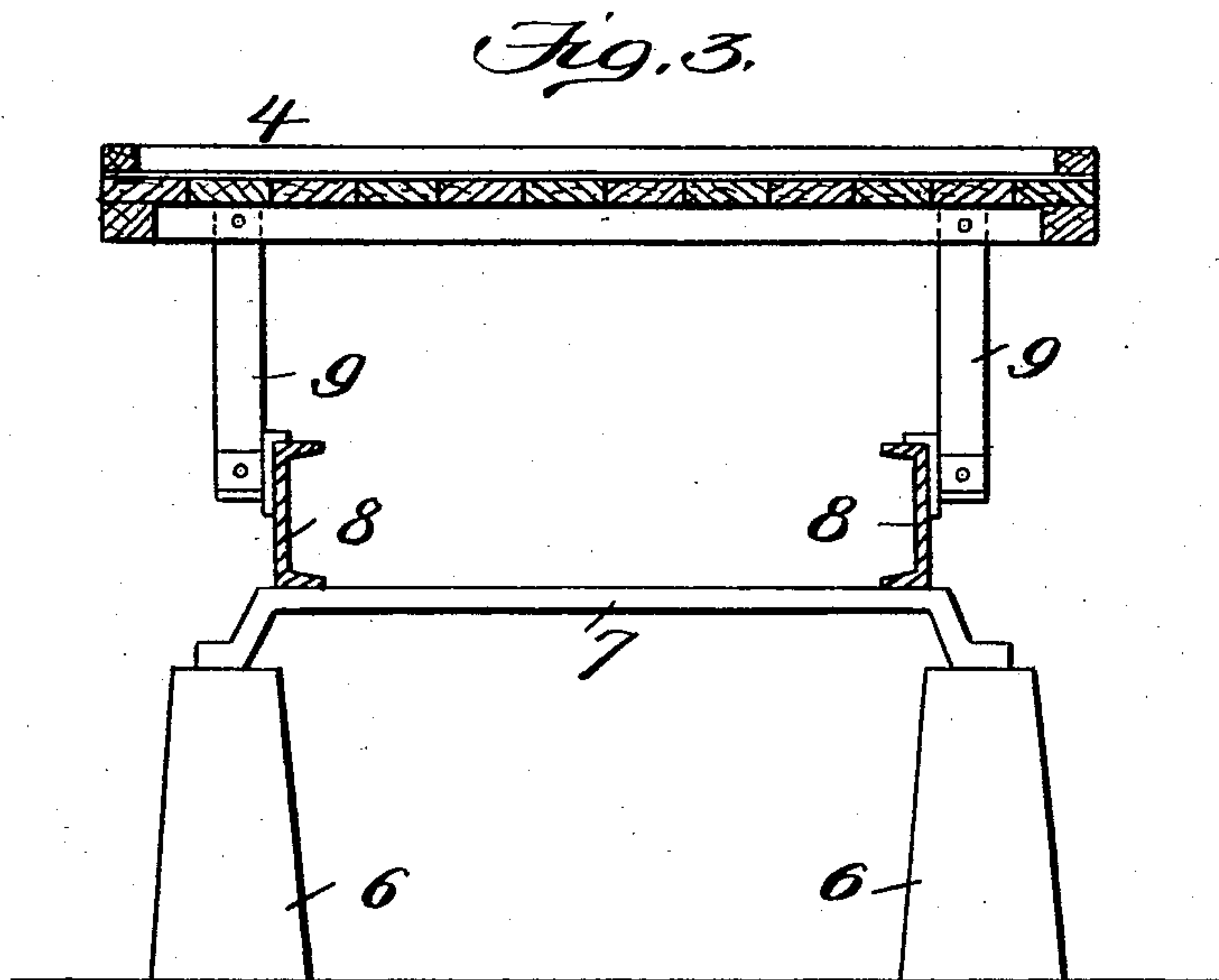
Inventor
Ulysses S. James
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Atty.

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3 SHEETS—SHEET 3.



Witnesses:

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J. B. Keeler

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By *James L. Norris*
att'y.

UNITED STATES PATENT OFFICE.

ULYSSES S. JAMES, OF NEWARK, NEW JERSEY, ASSIGNOR TO JAMES ORE CONCENTRATOR COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ORE-CONCENTRATOR.

968,951.

Specification of Letters Patent.

Patented Aug. 30, 1910.

Application filed November 13, 1907. Serial No. 401,999.

To all whom it may concern:

Be it known that I, ULYSSES S. JAMES, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Ore-Concentrators, of which the following is a specification.

This invention relates to ore concentrators, the object of the invention being to provide an effective apparatus of this character which in its operation effects large savings in mineral values of the mass supplied thereto.

While the machine can be employed with equal advantage for working pulp or slimes, it is of particular utility in its action on the latter which ordinarily is a waste product.

In the drawings accompanying and forming part of this specification I show in detail one form of embodiment of the invention which, to enable those skilled in the art to practice the same, will be set forth in detail in the following description, while the novelty of the invention will be included in the claims succeeding said description.

In the drawings: Figures 1 and 1^a represent collectively an ore concentrator in side elevation involving my invention. Figs. 2 and 2^a illustrate together a top plan view of the same. Fig. 3 is a transverse section on the line 3—3, Fig. 2^a. Fig. 4 is a similar view on the line 4—4 of said Fig. 2^a.

Like characters refer to like parts throughout the several figures of the drawings.

The ore concentrator in the present instance is made in the form of an endwise or longitudinally reciprocatory or vibratory table, the longitudinal or endwise movement of the table facilitating the stratification of the pulp or slimes thereon and also feeding the same from the head toward the tail end of said table and, in practice, I may provide any suitable form of head motion for giving to the table the action indicated. In Figs. 1 and 2 I have indicated conventionally a head motion, the same being denoted in a general way by 2 and resting on and being securely fastened in some suitable way to the foundation or pier 3 which may, for example, be made of concrete. The table includes what might be considered a primary section as 4 and a secondary section as 5, the pulp or slimes being initially supplied to the

primary section 4 and being worked therealong on to and then along the secondary section 5, the stratification of the mass or material and the final washing of the mineral values taking place on said secondary portion which may, therefore, aptly be termed a "finishing member." While the primary portion 4 may be disposed in any suitable manner, I prefer that it be at an inclination downwardly from the head end toward the tail end of the table, as an advantage follows this positioning of said primary portion. The secondary or finishing portion of the table will be hereinafter described in detail.

I may arrange opposite to each other at suitable intervals any desired number of piers or uprights as 6 of cement or other suitable material, the pairs of piers being shown as bridged by brackets as 7 which are connected to said piers in any desirable way and which in turn sustain the stringers 8, said stringers generally consisting of channel irons. The lower ends of the links 9 are flexibly connected to these stringers or channel irons 8, while the upper ends thereof are similarly connected to said primary section 4 underneath the same between the sides thereof, all as indicated in Fig. 3.

The finishing portion 5 is made up of flexibly connected sections united on diagonally disposed hinge lines as 10 which converge toward the extreme forward end of the table and which are shown clearly in Fig. 2^a.

In addition to the piers 6 to which I have previously referred there is a second pair of piers 6^a (see Fig. 4) bridged by a bracket or strut as 7^a resting on the same, said bracket or strut 7^a supporting the stringers 8^a. The lower ends of links as 9^a are flexibly connected with the stringers or channel irons 8^a, while their upper ends are similarly connected with the laterally intermediate part of the finishing portion 5 of the table, all as indicated clearly in Fig. 4.

In Figs. 1^a and 4 I have shown a second pair of piers 6^b upon which are superimposed and securely fastened brackets as 7^b to which are pivoted stringers or channel irons as 8^b. The lower ends of links as 9^b are flexibly connected with the stringers or channel irons 8^b, while the upper ends thereof are

likewise connected with the lateral parts of the finishing portion 5 of the table outside the forwardly converging hinge lines 10. It will be apparent that the stringers or channel irons 8^b are susceptible of swinging motion and this is utilized to angularly adjust the same. Any desirable means may be provided for angularly adjusting these stringers or channel irons 8^b; for instance, I may provide adjusting screws as 11 tapped through the extreme outer ends of the same and bearing at their lower ends against piers as 6^c (see Figs. 1^a and 2^a.) The upper ends of said adjusting screws 11 are equipped with hand-wheels 12 by the operation of which the screws can be turned to effect the adjustment of the said stringers or channel irons 8^b, the latter being, as will be clear, independently adjustable. Between the piers 6^b and 6^c I may arrange piers as 6^a bridged by brackets as 7^a to which the outer ends of the stringers or channel irons 8^a are connected.

I have described in detail a simple mounting for the table. The latter might be mounted in other ways.

The primary portion 4 of the table is preferably, as hereinbefore indicated, disposed at a downward inclination from the head toward the tail portion of the table. Preferably the upper surface of this longitudinally extending primary portion 4 of the table is smooth and, owing to its inclination, the slime delivered thereonto will have a greater velocity than when passing over a horizontal plane and, owing to this velocity, there is naturally a decrease in volume, so that the pulp or slime-water will move in a thin layer, by virtue of which the fine particles in the mass are brought into absolute contact with the smooth surface over which such mass travels. In addition to this, the heavier particles will adhere to the surface and stratification of the mass may also occur as the latter is gradually worked down said inclined portion 4.

The material may be supplied to the table in any suitable way, for example, by a feed distributor disposed at the head end thereof. I have shown such a feed distributor, the same consisting of a box as 13 fastened to the extreme head end of the table and having in its bottom a row of holes 13^a through which the pulp or slime-water is discharged onto portion 4 of the table. The row of holes 13^a extends the complete length of the said box 13 or the complete width of the portion 4 of the table, so that the pulp, slimes, or slime-water is distributed equally transversely of or across said portion 4. Along the sides of the portion 4 and throughout the complete length thereof are extended strips or flanges as 14 which prevent the lateral escape of the material thereon.

The pulp or slimes is discharged from the portion 4 into a pan or receptacle such as that denoted in a general way by 15 and shown clearly in Fig. 2^a. The pan or receptacle 15 consists of an end 16, a horizontal bottom 17, and two sides 18. The end 16 slopes downwardly from the portion 4 and its sides converge forward coincident with the inner ends of the sides 18 which are inclined upwardly from the bottom 17. The said pan or receptacle 15 contains a longitudinally extending ridge 19, the sides 20 of which are inclined downward and outward from the apex thereof, the forward end of said ridge being of wedge shape to facilitate its division of the oncoming pulp or slimes and overlying the end 16 of the pan 15. It will be understood that the surfaces 18 and 20 respectively converge downward, thereby forming gutters into which the two divisions or bodies of the pulp or slimes are received and are fed forward during the reciprocation of the table as a whole. It will be understood that the partially stratified material, after it leaves the inclined primary portion 4 of the table, passes down the inclined surface or end 16 of the pan or receptacle 15 and, when it enters said pan or receptacle, such mass is divided into two separate but equal portions by the divider or ridge 19, these two divisions being fed forward through the gutters or channels defined by the surfaces 18 and 20 respectively, but more especially along and then up the inclined surfaces 18 where they pass onto the duplicate riffled portions 21, said riffled portions extending downward at an angle from the hinge lines 10. Between these riffled portions 21 is a horizontal area 22, the inner portion of which is at a point, the sides of the point being located between the areas 20. The heavier concentrates, after they leave the gutters or channels formed by the areas 18 and 20, respectively, are fed onto this horizontal surface 22 and are moved along the same, being finally delivered off the tail or extreme forward end of the table. The lighter concentrates are discharged from off the head end of the table between the hinge lines 10 and the sides of the portion 5, leaving said end in accordance with their specific gravities. The very heaviest minerals are discharged from the head end of the table, of course, between the hinge lines 10, while the lighter values are discharged from said end at places outside of said hinge line. The wash water may be supplied by a pipe such as that denoted in a general way by 23, the horizontal branch 23' of said pipe extending longitudinally from the tail end of the table toward the head end thereof and terminating substantially at the pointed inner end of the horizontal surface or area of the two hinge lines 10. It will be clear that the riffled

portions 21 are downwardly inclined from said hinge lines. The inner ends of said portions 21 converge rearwardly upon acute angles and are furnished with ridges or
 5 ledges 14' continuations of the ridges or flanges 14. The sides of said riffled portions 21 are also upon rearwardly converging angles of greater acuteness than those of the ends thereof, all as clearly shown in Fig.
 10 2^a. The riffled portions 21 are provided with longitudinally extending riffles 24 and other riffles as 25 which join with the riffles 24, respectively. The riffles 24 are substantially parallel with the respective hinge lines
 15 10, while the riffles 25 constituting practically continuations of the respective riffles 24 are parallel with the longitudinal axis of the table as a whole.

While cross-sectionally the several sets of
 20 riffles are the same in area, the riffles 24 are separated a greater distance than the riffles 25, as shown in Fig. 2^a, and this relative variation in spaces between the said riffles can be accomplished by disposing the rear
 25 ends of the riffles 25 or the forward ends of the riffles 24 in step order or along lines or planes angularly disposed and converging rearwardly the sets of riffles 24 and 25 merging on diagonal lines which diverge rela-
 30 tively toward the opposite sides of the table. By virtue of this relation the refuse matter which is delivered over the sides of the portions 21 is permitted more freely to spread and is not retarded in its progress toward
 35 the sides of said portions 21 over which it is discharged. The inclination, however, of the two adjustable or riffled portions 21 is enough to retard the lateral flow of the pulp to an extent sufficient to insure complete stratification of the pulp or slimes,
 40 while such lateral flow is further arrested by means of the upwardly inclined portions 26 at the extreme outer sides of said portions 21 and extending throughout the complete length of said sides.

The term "settling" as used in the claims is intended to designate that part or section of the table which performs the function of settling the solids out of the muddy water,
 50 that is, it clarifies slime water so that it is practically clear on the surface, while the term "stratify" designates that part described as the stratifying section which takes the so settled pulp and stratifies the pulp
 55 into lighter and heavier strata.

I may make the two portions of the table, as is common in this art, of a wooden or metallic frame of composite construction,
 60 the upper surface or working portion of the table being preferably made from linoleum or some equivalent substance covering boards laid on said frame and which are so shaped cross-sectionally as to secure the various inclinations or angles on the finishing portion
 65 of the table. Where the hinge lines 10 are

made these boards may be kerfed on their under sides. I do not believe it necessary to go into detail as to these features as they in themselves form no part of the invention
 70 which, as to that form of embodiment thereof selected for illustration in the accompanying drawings, has been fully set forth hereinbefore.

What I claim is:

1. An ore concentrating table having pri- 75
 mary settling and secondary finishing portions, the working surface of the primary portion being inclined relatively to said secondary portion and connected to deliver the settled material to said secondary por- 80
 tion, and the secondary portion having a dividing member and riffled portions at opposite sides of said dividing member, said dividing member serving to divide the mass on the table into separate bodies prepara- 85
 tory to reaching said riffled portions.

2. An ore concentrating table having settling and finishing portions, the working surface of the settling portion being dis- 90
 posed at a downward forward inclination from the head end of the table for delivering the settled material to said finishing portion, and the finishing portion having a di-
 95 viding member for receiving and distributing the mass from the settling portion, and opposite riffled portions to receive the mass distributed by said dividing member.

3. An ore concentrating table having a primary feed and settling section and a sec- 100
 ondary finishing section, the primary section being inclined downwardly toward the finishing section and capable of supplying settled material to the finishing section, and the finishing section embodying a depressed basin capable of receiving settled material 105
 from the primary section and stratifying such material, the secondary section also embodying a pair of riffled portions which slope downwardly toward the opposite sides of the table, together with means for divid- 110
 ing and distributing equal portions of the stratified material from the basin to the riffled finishing portions.

4. An ore concentrating table having a feed and settling section and a finishing sec- 115
 tion, the working surface of the feed and settling section being inclined, a distributor for supplying the material to be worked on said table, carried at the head end of said feed and settling section, and means for sup- 120
 plying wash water onto the finishing section, the finishing section embodying riffled sections sloping downwardly from the opposite sides of said water supplying means.

5. An endwise reciprocatory ore concen- 125
 trating table having primary and secondary portions, the primary portion serving to supply the material on the table to the sec-
 130 ondary portion thereof on the reciprocation of said table, the primary portion being

plain and the secondary portion having two lateral downwardly-inclined riffled portions, and means arranged to receive the material from the primary section and to divide and distribute it upon the downwardly inclined riffled portions.

6. An endwise reciprocatory ore concentrating table having primary and secondary portions, the primary portion serving to supply the material on the table to the secondary portion thereof on the reciprocation of said table, the primary portion being plain and the secondary portion having two lateral downwardly-disposed riffled portions, a dividing member for distributing the material from the primary section upon said riffled portions; and means for adjusting the lateral inclination of said riffled portions.

7. An endwise reciprocatory ore concentrating table having primary and secondary portions, the primary portion serving to deliver the mass in a central longitudinally flowing stream onto the secondary portion, and the latter having two laterally inclined relatively adjustable finishing portions which slope downwardly toward the opposite sides of the table, and provided with means for dividing and distributing the said stream.

8. An ore concentrating table having primary settling and secondary stratifying and finishing portions, the secondary portion having a basin, the outer sides of which are upwardly inclined, the secondary portion also having transversely inclined riffled portions for receiving the material from said basin.

9. An endwise reciprocatory ore concentrating table having a stratifying basin to receive the mass to be worked, dividing means for the mass passing from said basin, and laterally inclined concentrating portions at opposite sides of and adapted to receive the divided mass from said basin.

10. An endwise reciprocatory ore concentrating table having a basin to receive the mass to be worked, a distributor for the mass supplied to said basin, dividing means to act on the mass leaving said basin, laterally-inclined concentrating portions at opposite sides of and adapted to receive the divided mass from said basin, and means for supplying wash water onto said laterally-inclined portions.

11. An ore concentrating table having a stratifying basin to receive the material to be worked, laterally-inclined riffled portions at opposite sides of and adapted to receive the material flowing over the edge of said basin, and means for dividing the material into two separate bodies prior to its passage onto said laterally-inclined portions.

12. An endwise reciprocatory ore concentrating table having a stratifying basin and

laterally inclined riffled portions forming a longitudinal ridge in alinement with and adapted to receive stratified material flowing over the edge of said basin, and a settling section to initially receive the material and settle the solids and arranged to discharge the material so settled into the stratifying basin.

13. An endwise reciprocatory ore concentrating table having two oppositely-inclined riffled relatively-adjustable portions, means for feeding material endwise to said portions, means for supplying wash-water onto the table between said portions and means adapted to divide the material and to distribute it equally upon said oppositely-inclined riffled portions.

14. An ore concentrating table having a finishing portion provided with two laterally-inclined flexibly-mounted sections connected with the table by forwardly-extending hinge lines, each section having two sets of joining riffles, one set of each section extending in parallelism with the respective hinge lines, and the other set extending in parallelism with the longitudinal axis of the table.

15. A longitudinally reciprocatory concentrating table having a settling portion, a stratifying portion to receive the pulp from the settling portion, a finishing portion arranged to receive pulp from the stratifying portion combined with means for dividing the pulp, means for supplying wash-water thereto, and oppositely sloping surfaces for causing the pulp to flow in opposite directions toward the lateral sides of the table.

16. A longitudinally reciprocatory concentrating table having a longitudinally inclined settling portion, a finishing portion having sections inclined toward opposite sides of the table, means for supplying pulp on to the head end of the settling portion, means for supplying wash water to the finishing portion, and means for changing the inclination of the finishing portion independently of the settling portion.

17. An ore concentrating table having a finishing section provided with surfaces sloping laterally toward the opposite sides of the table, a feed and settling section, and a depressed stratifying section arranged between the feed and finishing sections for receiving and stratifying the settled material from the former and delivering it to the latter.

18. An ore concentrating table having a finishing section, a feed and settling section, and a stratifying basin arranged at and depressed below the level of the discharge end of the feed section for receiving settled material therefrom and stratifying the material before discharging it upon the finishing section.

19. An ore concentrating table having a finishing section, a downwardly and forwardly inclined feed and settling section, and a stratifying basin arranged at the lower discharge end of the feed and settling section and having centrally converging sides serving to stratify and discharge the material therefrom in a central longitudinally flowing stream upon the finishing section.

20. An ore concentrating table having a laterally inclined finishing section, a feed and settling section having means for supplying material thereto throughout the width of the feed and settling section, and a basin arranged intermediate and depressed below the level of the feed and finishing sections and having a converging outlet for passing the settled material from the feed and settling section and forming a stream of the material at the longitudinal center of the table preparatory to its treatment upon the finishing section.

21. A longitudinally reciprocable ore concentrating table having a laterally inclined finishing portion provided with sets of riffles extending in different angular directions, the riffles toward the head end of the table extending obliquely and sloping upwardly with respect to the length of the table, and the riffles of the other set extending parallel to the length of the table at its discharge end and forming continuations of the obliquely extending riffles of the set first mentioned.

22. A longitudinally reciprocable ore concentrating table having longitudinally spaced settling and stratifying sections, and a finishing section sloping laterally and provided on its surface with sets of riffles extending in different angular directions, the riffles of one set extending obliquely to the length of the table and those of the other set extending parallel to the length of the table, the riffles of said sets merging in a line extending diagonally to the length of the table.

23. An ore concentrating table comprising a longitudinally extending feed section, and a finishing section arranged to receive the material from the feed section, the finishing section being oppositely inclined downwardly toward the opposite sides of the table and being provided on its surface with sets of riffles, one set of riffles being arranged adjacent to the discharge of the feed section and extending angularly relatively to the length of the table and the other set of riffles extending substantially parallel to the longitudinal center of the table and forming continuations of the riffles of the other set and a dividing member at the discharge end of the feed section.

24. A longitudinally reciprocable ore con-

centrating table comprising a downwardly and forwardly inclined feed and settling section and having means for supplying material to the head thereof, a finishing section having portions sloping downwardly from the longitudinal center toward the opposite sides of the table to form a ridge, the material being fed longitudinally of said ridge and upon the finishing section, and the surface of the latter being provided toward its opposite sides with sets of riffles which extend in directions from the lateral edges of the table forwardly and toward the center thereof, and a stratifying basin interposed between and depressed below the outlet end of the feed and settling section and the entrance to the finishing section.

25. An ore concentrator comprising a longitudinal settling portion, a stratifying portion arranged to receive settled pulp from the settling portion, and a laterally sloping and flexibly connected finishing portion provided with means for varying its inclination independently of the settling and stratifying portions.

26. An ore concentrating table comprising a longitudinal settling portion, a stratifying portion located to receive settled pulp from the settling portion, flexibly connected and laterally sloping finishing portions arranged to receive stratified material from the stratifying portion, and means for adjusting the lateral inclination of said finishing portions independently of the settling and stratifying portions.

27. An ore concentrating table involving a pair of lateral oppositely inclined finishing portions, a depression or basin arranged between them and toward the feed end of the table and having converging sides for supplying stratified material to said finishing portions in the form of a longitudinally flowing stream which is divided and distributed equally upon said finishing portions, and a settling section located in advance of said depression or basin for initially receiving and settling the material before entering such depression or basin.

28. An ore concentrating table involving a finishing section having a pair of lateral oppositely inclined portions forming a ridge between them, a depression or basin arranged centrally of said ridge and having portions extending beyond the same toward the finishing section to receive the material fed to the table and to deliver it in divided parts to said inclined portions, and a settling section located in advance of said depression or basin for initially receiving and settling the material and for discharging the material so settled into said depression or basin.

29. An ore concentrating table having a longitudinal settling portion, a stratifying

portion, and a flexibly connected laterally inclined finishing portion, means for adjusting the lateral inclination of the finishing portion independently of said settling and
5 stratifying portions, and means for supplying dressing water onto the finishing portion.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ULYSSES S. JAMES.

Witnesses:

OSCAR B. HOFSTRAND,
FANNY B. JAMES.