

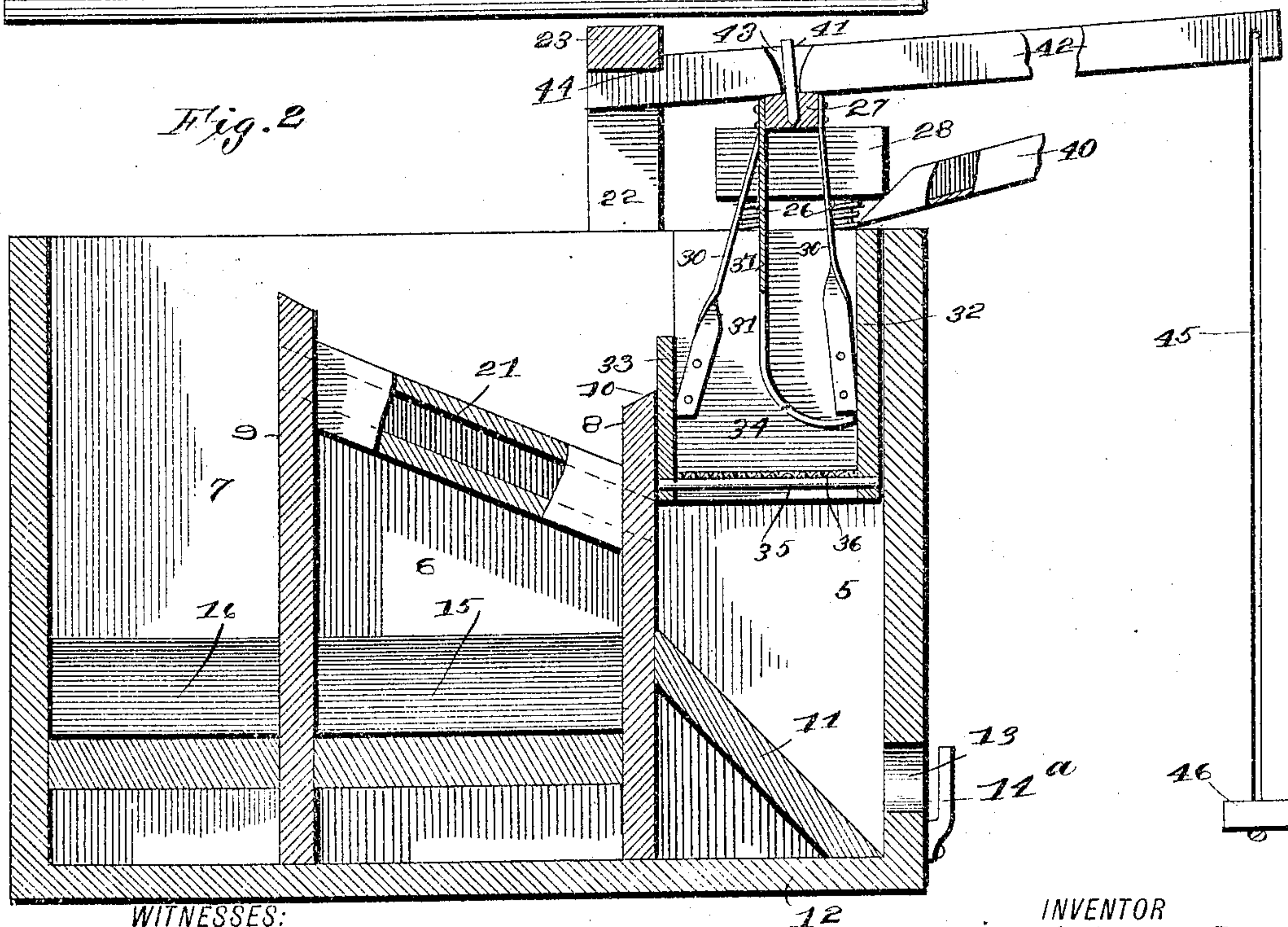
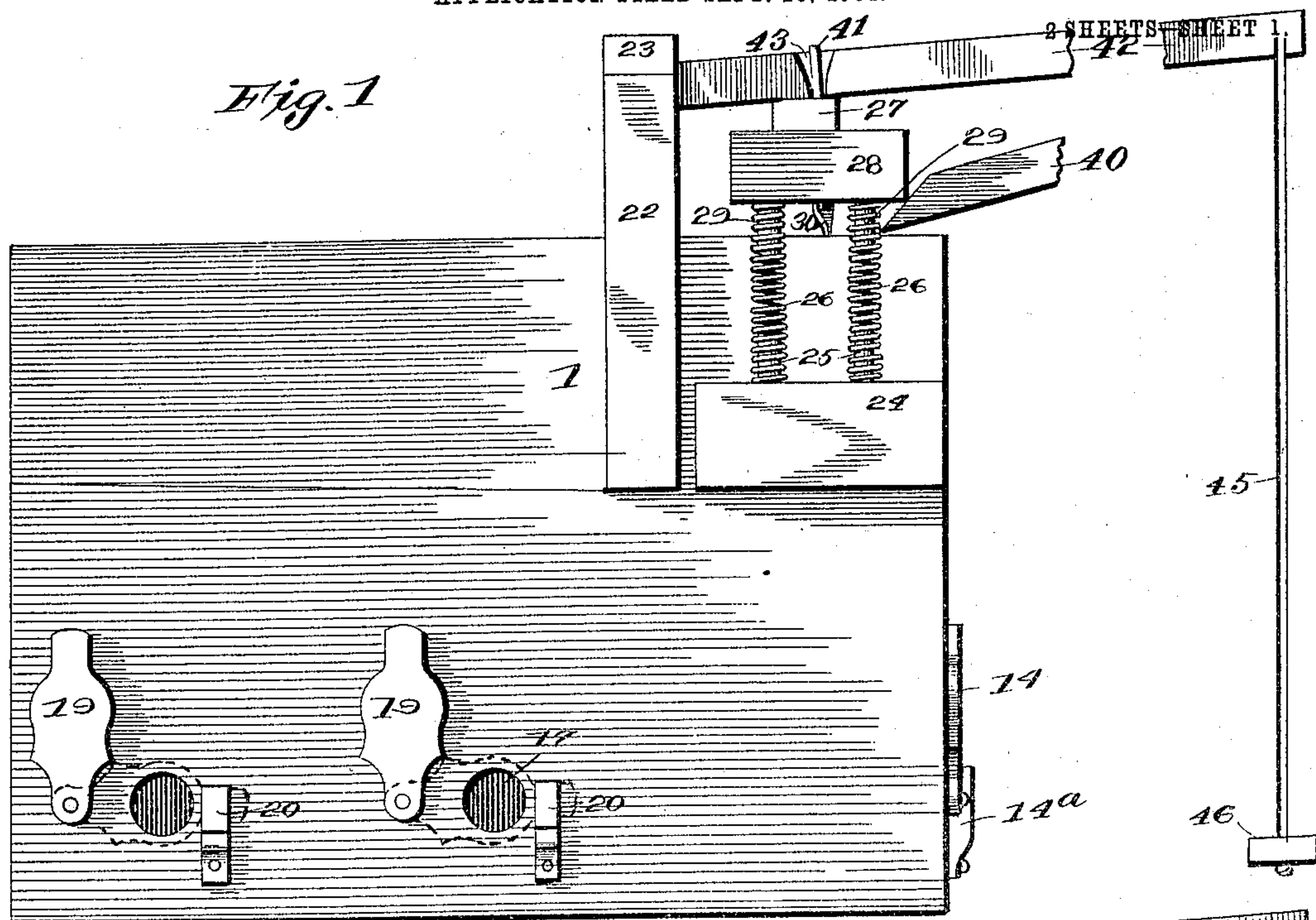
No. 783,304.

PATENTED FEB. 21, 1905.

M. E. PARKS.
ORE CONCENTRATOR.

APPLICATION FILED SEPT. 20, 1904.

~~2 SHEETS~~ SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3

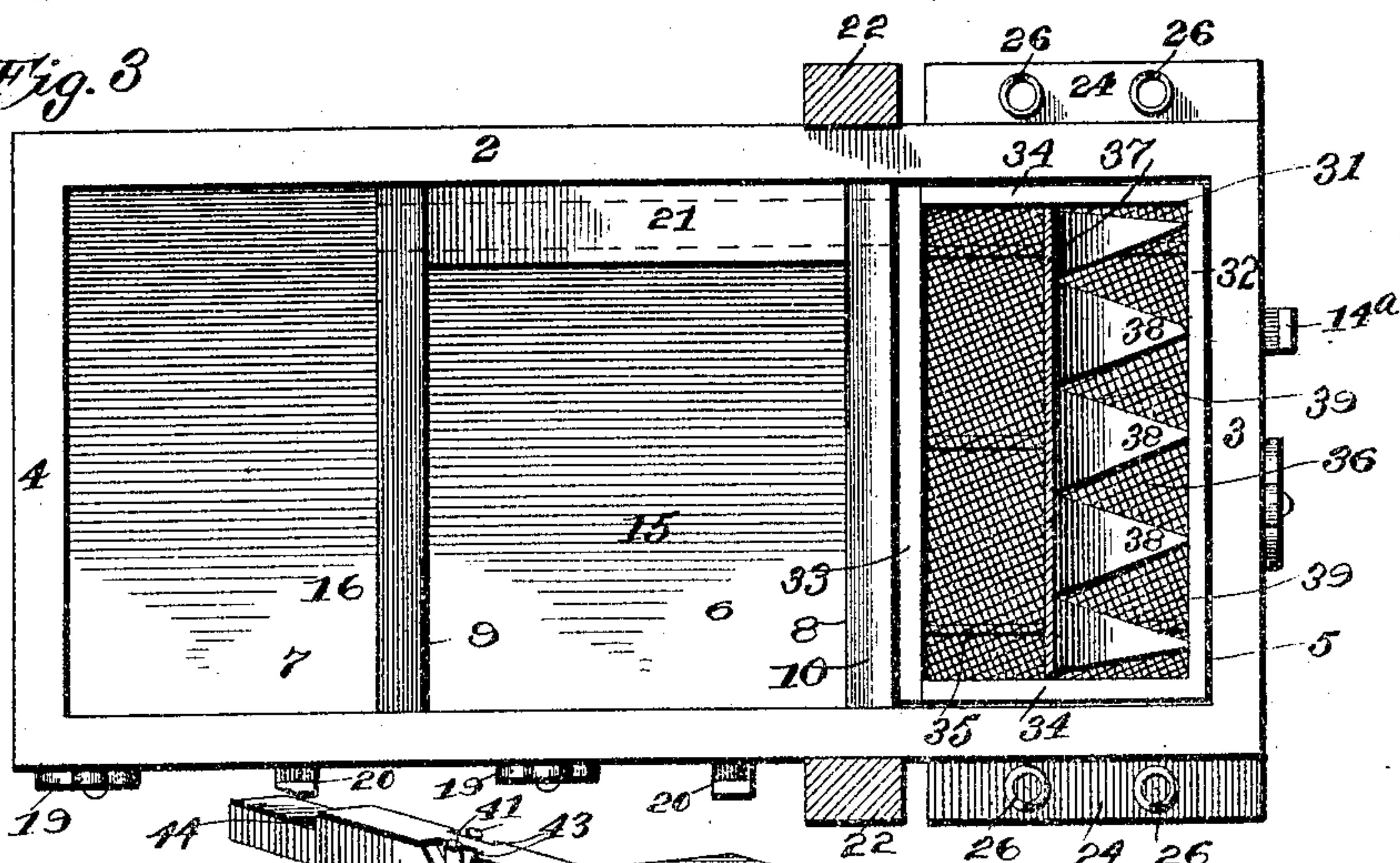


Fig. 4

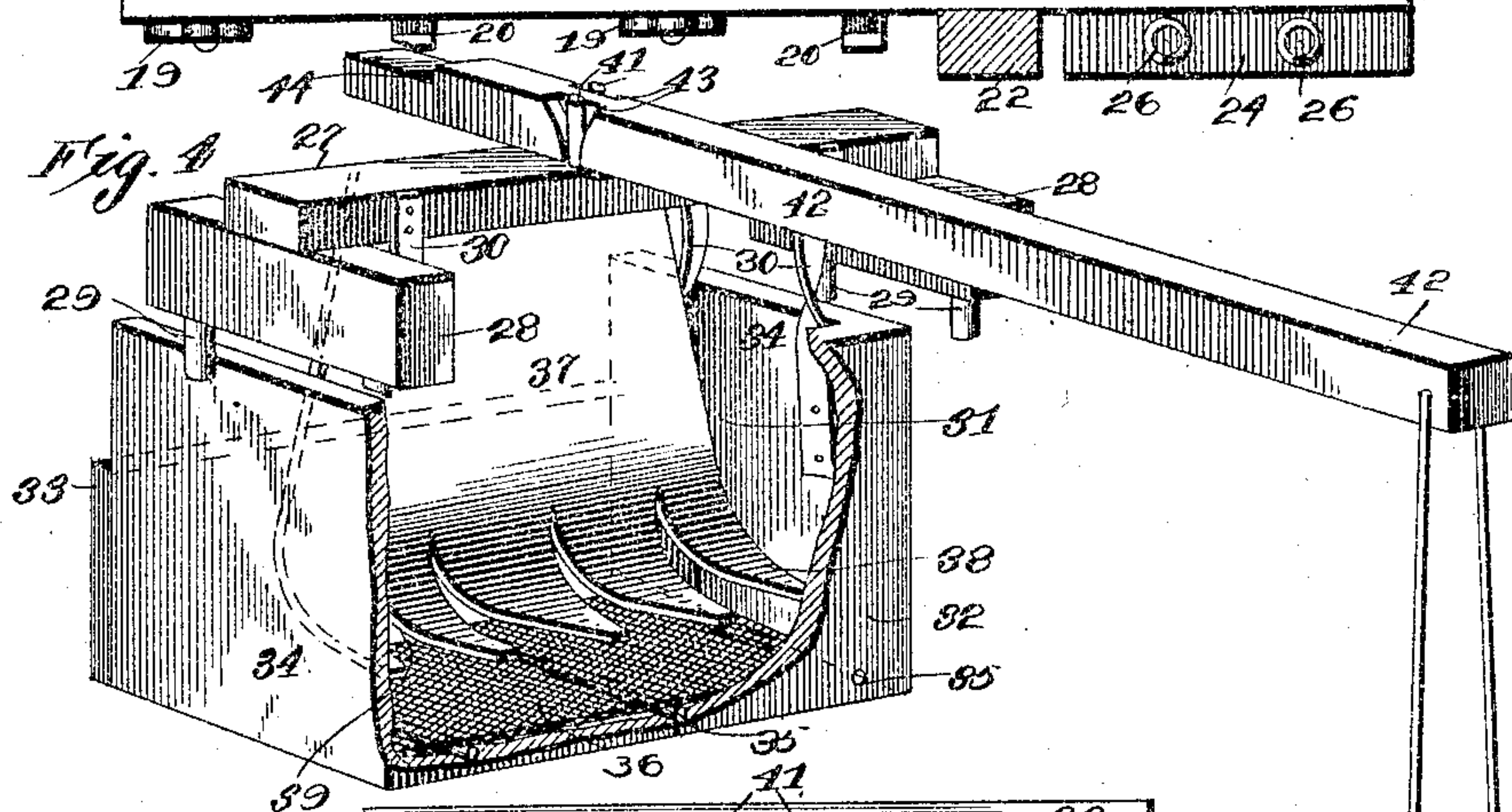
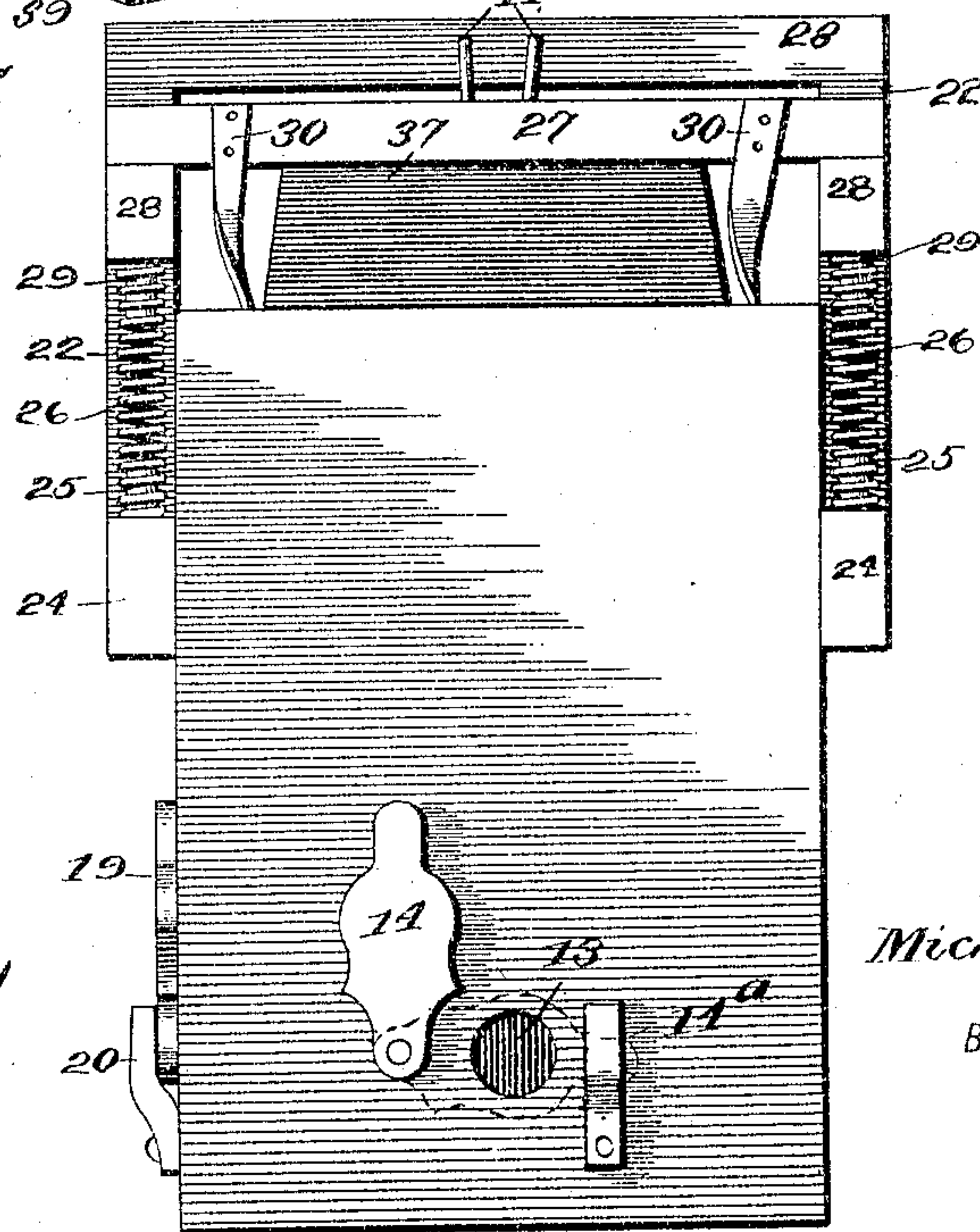


Fig. 5



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UNITED STATES PATENT OFFICE.

MICHAEL E. PARKS, OF TORREON, MEXICO.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 783,304, dated February 21, 1905.

Application filed September 20, 1904. Serial No. 225,209.

To all whom it may concern:

Be it known that I, MICHAEL E. PARKS, a citizen of the United States, residing at Torreon, State of Coahuila, United States of Mexico, have invented a new and useful Improvement in Ore-Concentrators, of which the following is a specification.

This invention relates to concentrators or separators for ores; and it consists, substantially, in the construction and combinations of parts hereinafter particularly described, and pointed out in the claims.

The invention is adapted for the concentration or separation of various kinds of ores, and one of the principal objects thereof is to overcome numerous disadvantages and objections common to many other structures hitherto devised for similar purposes and also to provide means by which the operations of ore concentration or separation may be carried on more expeditiously and economically as well as with a small expenditure of power.

A further object is to provide an ore concentrator or separator of simple and inexpensive embodiment, besides being effective and reliable in use or operation and possessing the capacity for long and repeated service.

The above and additional objects are attained by means substantially such as are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved ore concentrator or separator. Fig. 2 is a central longitudinal sectional view thereof, parts being broken out to more clearly indicate construction. Fig. 3 is a sectional plan view taken in the plane of the upper edge of the side wall of Fig. 1. Fig. 4 is a view in perspective of the jigger and deflector and the supporting means therefor, a part of the outer side of the jigger being broken away to more clearly indicate the interior construction thereof. Fig. 5 is a front elevation of the structure with the operating device for the jigger detached or removed.

Before proceeding with a more detailed description it may be stated that in the form of my improvements herein shown I employ, preferably, a rectangular structure of any desired dimensions, the same being divided in-

teriorly into compartments which I denominate, respectively, the "concentrator-box," the "tailings-box," and the "slimes-box," said compartments preferably extending the full inner width of the structure and being in communication the one with the other, as will hereinafter appear. Within the concentrator-box I employ a jigger or screen-box of special construction, combined with which is a deflector or guard, also of special construction, said elements being supported in position by special means therefor, suitably mounted above and transversely of the concentrator-box. Special means are employed for imparting a vertically-reciprocatory motion to the jigger and deflector, and while I have herein represented my improvements in a certain preferred embodiment it will be understood, of course, that I am not limited to the precise details thereof, in practice, since immaterial changes therein may be resorted to coming within the scope of my invention.

Reference being had to the accompanying drawings by the designating characters marked thereon, 1 and 2 designate the side walls of the outer structure of the concentrator or separator, and 3 and 4 the front and rear walls thereof, respectively, it being observed that said structure is rectangular in plan view and preferably open at the top from front to rear. The interior of the structure is divided transversely into a concentrator-box 5, a tailings-box 6, and a slimes-box 7, by means of partitions 8 and 9, respectively, the latter being somewhat less in height than the walls of the structure and the said partition 8 being less in height than the said partition 9. The upper surface 10 of the partition 8 is beveled or inclined rearwardly of the structure, while the corresponding surface of the partition 9 is beveled or inclined forwardly of the structure, each for the purpose hereinafter more fully explained, and it will be observed that the floor 11 of the concentrator-box is inclined outwardly and downwardly from the outer side of the partition 8 to the forward end of the base 12 of the structure, thus to cause the ore-concentrates the more readily to fall or gravitate toward the front wall 3, where they may be removed at any time through an open-

ing 13 for that purpose closed by a suitable pivoted valve or door 14, held in place by a keeper 14^a. The floors 15 and 16 of the tailings-box and the slimes-box, respectively, are inclined downwardly from the inner surface of side wall 2 to the base of the structure at the inner surface of side wall 1 to facilitate collection of the tailings and slimes, the removal of the tailings being effected through an opening 17 in side wall 1 and the removal of the slimes through a similar opening in said wall, said openings being closed by pivoted valves or doors 19, as shown, each of which is held in place by a keeper 20. (See Fig. 1.)

Extending longitudinally of the tailings-box 6, alongside the inner surface of one of the side walls of the structure, is a forwardly and downwardly inclined conduit 21, the lower end of which is supported by the upper part of partition 8 and is in communication with the concentrator-box, and the upper end of which is supported by the upper part of partition 9 and is in communication with the slimes-box. The purpose of this conduit is to convey clear water from the slimes-box to the concentrator-box as the slimes are being precipitated in the slimes-box, as will hereinafter more fully appear.

Mounted transversely of the structure by means of suitable uprights 22, secured to the side walls 1 and 2, is a beam 23, disposed at a suitable height and preferably (though not essentially) substantially in line with partition 8, and also secured to said side walls 1 and 2 in advance of the uprights 22 are blocks 24, each provided with two or more posts 25, which are received by the lower coils of spiral springs 26, having their lower bearings on the upper surfaces of said blocks 24. Supported by the upper extremities of said springs at a suitable height above the upper surfaces of the walls of the structure is a yoke 27, disposed transversely and substantially centrally of the concentrator-box 5, said yoke extending somewhat beyond the outer surfaces of side walls 1 and 2 and provided on its projecting ends at the under sides with longitudinally-extending blocks 28, having on their under surfaces the downwardly-projecting pins 29, alining with the posts 25, and which enter or are received by the upper coils of the springs 26, it being apparent that in this way the yoke has an elastic or yielding support.

Rigidly suspended from said yoke, preferably by metal straps 30, secured to the same near each end, is a jigger or screen-box 31, constructed with the forward side member 32, the rearward or inner side member 33, and the end sections 34, said jigger fitting closely within the concentrator-box 5, yet in a manner to permit of the same being reciprocated vertically therein. The maximum depth of the jigger or screen-box is approximately one-half the height of the outer walls of the struc-

ture, and it will be noted that the said inner side member 33 thereof is considerably less in height than the said forward side member 32, the upper edges of which, as well as the upper edges of end sections 34, being normally substantially flush or even with the upper surfaces of said outer walls. The upper edge of the said inner side member 33 of the jigger or screen-box normally occupies a position somewhat above the rearwardly-inclined upper surface of partition 8, and the said outer and inner members of said device are connected by means of strengthening rods or braces 35, above which is disposed a screen or reticulated bottom 36, as shown.

Rigidly secured to the rearward side of the yoke 27 is the upper part of a deflector or guard 37, which extends downwardly a suitable extent within the jigger or screen-box and which is constructed at its lower portion with forwardly-projecting and upwardly-curved teeth 38, the ends of which about reach to the inner surface of the outer side member of the jigger, said teeth being separated by substantially triangular spaces 39, formed by the edges thereof, and each tooth being substantially triangular in shape and preferably (though not essentially) tapered to a point. The said deflector or guard is reciprocated with the jigger, and the function thereof is to prevent ore that is fed to the jigger from falling over into the tailings-box before being subjected to the action of the jigger. The teeth 38 and spaces 39 therebetween constitute practically a grate through which the ore falls after being somewhat broken up by impact with the vertical portion of the deflector or guard 37, it being noted that the ore is fed to the jigger by means of a chute 40 or in any other suitable way.

The jigger and its supporting-yoke may be vertically reciprocated from any suitable source of steam or other power, but preferably I employ the manually-operated devices herein shown. Thus secured to either side of the longitudinal center of the upper surface of the yoke 27 are posts 41, disposed a suitable distance apart and between which is located an operating-lever 42, having in the sides thereof upwardly-widened notches 43, in which said posts are received, as shown, the forward extremity of the shorter arm of said lever abutting the under surface of the beam 23 and formed with a transverse shoulder 44, engaging the lower edge of said beam in the operation of the structure. The lever is inclined upwardly in the direction of the front of the structure, and at the end of its longer arm is suspended a double cord or chain 45, to the ends of which are secured the ends of a stirrup 46, in which the operator places his foot to impart a vertical oscillatory motion to the lever, thereby transmitting the desired reciprocatory motion to the jigger and the deflector or guard.

In operation the bottom of the jigger or screen-box is covered to a suitable depth (say, about one inch) with heavy ore, whereupon the interior of the entire structure is practically filled with water and the ore to be concentrated is fed into the jigger from the chute. The said jigger is then reciprocated vertically in the manner and by the means herein described, and on each descent thereof water is forced upwardly through the screen and carries the tailings and slimes over the upper edge of the rearward or inner side member 33 of the jigger, such edge being now substantially flush with the outer edge of the rearwardly-inclined upper surface of the partition 8. The tailings settle to the bottom of the tailings-box and the slimes being lighter in weight pass over to the slimes-box and settle therein, some of the cleaner water from the slimes-box passing to the concentrator-box through chute 21. In virtue of the rearwardly-inclined upper surface of the partition 8 the passing of the materials from the concentrator-box to the tailings-box is facilitated, and should any of the tailings tend to pass from the tailings-box to the slimes-box they will be caused to roll backwardly into the tailings-box, due to the inclined upper surface of partition 9, and nothing will prevent the slimes from passing over said partition into the slimes-box, all in an obvious manner. As the stirrup 46 is carried downwardly by pressure of the foot of the operator the longer arm of the lever 42 and the yoke 27 and jigger 31 are also carried downwardly, the supporting-springs for said yoke being thereby compressed, and then on relieving the stirrup of pressure the said springs will expand and the said longer arm of the lever and the yoke and jigger will be carried upwardly to their first positions, and so on repeatedly. During these movements the upwardly-diverging sides of the notches 43 in the lever are alternately carried in the direction of the posts received by said notches, said lever thus having a rocking motion on the yoke as the latter is caused to move up and down in the manner explained. As the jigger and its co-operating elements are reciprocated the heavier ore gradually works through the screen 36 and passes to the concentrator-box in the form of concentrates, and in virtue of the inner side member of the jigger being less in height than the outer side member and end sections thereof the passing of the tailings and slimes from the jigger is accomplished without having to rise to the maximum height of the jigger and which is a decided advantage, as is apparent.

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

1. An ore-concentrator, comprising an outer structure, transverse forward and rearward vertical partitions dividing the interior

thereof into a concentrator-box, a tailings-box, and a slimes-box, and a vertically-reciprocatory jigger in the concentrator-box, combined with means for operating the same, said rearward partition being less in height than the walls of the structure, and said forward partition less in height than the rearward partition, the inner side of the jigger being also less in height than the outer side thereof.

2. An ore-concentrator, comprising an outer structure, transverse forward and rearward vertical partitions dividing the interior thereof into a concentrator-box, a tailings-box, and a slimes-box, and a vertically-reciprocatory jigger in the concentrator-box, combined with means for operating the same, said rearward partition being less in height than the walls of the structure, and having the upper surface thereof downwardly and forwardly inclined, and said forward partition being less in height than the rearward partition, and having its upper surface downwardly and rearwardly inclined, the inner side of the jigger being less in height than the outer side thereof.

3. An ore-concentrator, comprising an outer structure, transverse forward and rearward partitions dividing the interior thereof into a concentrator-box, a tailings-box, and a slimes-box, a vertically-reciprocatory jigger in the concentrator-box, and means for operating the same, said forward partition being less in height than the rearward partition, and an inclined conduit supported by the upper parts of said partitions and leading from the slimes-box to the concentrator-box.

4. An ore-concentrator constructed of a concentrator-box, a tailings-box and a slimes-box, combined with a vertically-reciprocatory jigger in the concentrator-box, means for operating the same, and a deflector movable with the jigger and extending therein, the same having a grate at an angle thereto and extending to one side of said jigger.

5. An ore-concentrator constructed of a concentrator-box, a tailings-box and a slimes-box, combined with a vertically-reciprocatory jigger in the concentrator-box, means for operating the same, and a deflector movable with the jigger and extending therein, the same being bent at an angle at its lower end and formed with teeth reaching to one of the walls of said jigger.

6. An ore-concentrator, constructed of an outer structure having therein a concentrator-box, a tailings-box, and a slimes-box, a transverse beam supported above the structure rearwardly of the concentrator-box, and a vertically-reciprocatory jigger in the latter, combined with means for operating the same, said means comprising a vertically-yieldable yoke supported at a lower elevation than the beam, and provided on the upper surface thereof with parallel posts, and an operating-lever for the yoke, having upwardly-widened notches in its sides, in which said posts are received, the

shorter arm of the lever abutting the under surface of the beam, and having a shoulder engaging the lower forward edge of said beam.

7. An ore-concentrator, constructed with a
5 concentrator-box, a tailings-box, and a slimes-box, a vertically-yieldable yoke supported transversely above the concentrator-box, a
jigger rigidly suspended therefrom, a deflec-
tor also rigidly suspended from the yoke, and
10 extending within the jigger, and means for operating the yoke to impart a vertically-reciprocatory motion to the jigger, said deflector having forwardly-projecting teeth at its lower
part.

15 8. An ore-concentrator, constructed with a concentrator-box, a tailings-box, and a slimes-box, a vertically-yieldable yoke supported transversely above the concentrator-box, a
jigger rigidly suspended therefrom, a deflec-
tor also rigidly suspended from the yoke, and
20 extending within the jigger, and means for operating the yoke to impart a vertically-recip-

rocatory motion to the jigger, said deflector having at its lower part forwardly-projecting and upwardly-curved teeth extending to the
25 front wall of the structure, and said teeth being each tapered to a point and separated by approximately triangular spaces.

9. An ore-concentrator, constructed of an
outer structure having therein a concentrator-
30 box, a tailings-box, and a slimes-box, blocks secured to the outer walls of the structure in line with the concentrator-box, each provided with posts, springs seated upon the blocks, in
the lower coils of which said posts are received,
35 a transverse yoke mounted upon the upper ends of the springs above the concentrator-box, a jigger in the latter, and a lever movably supported by the yoke for operating the same
to impart a reciprocatory motion to said jigger. 40

MICHAEL E. PARKS.

Witnesses:

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