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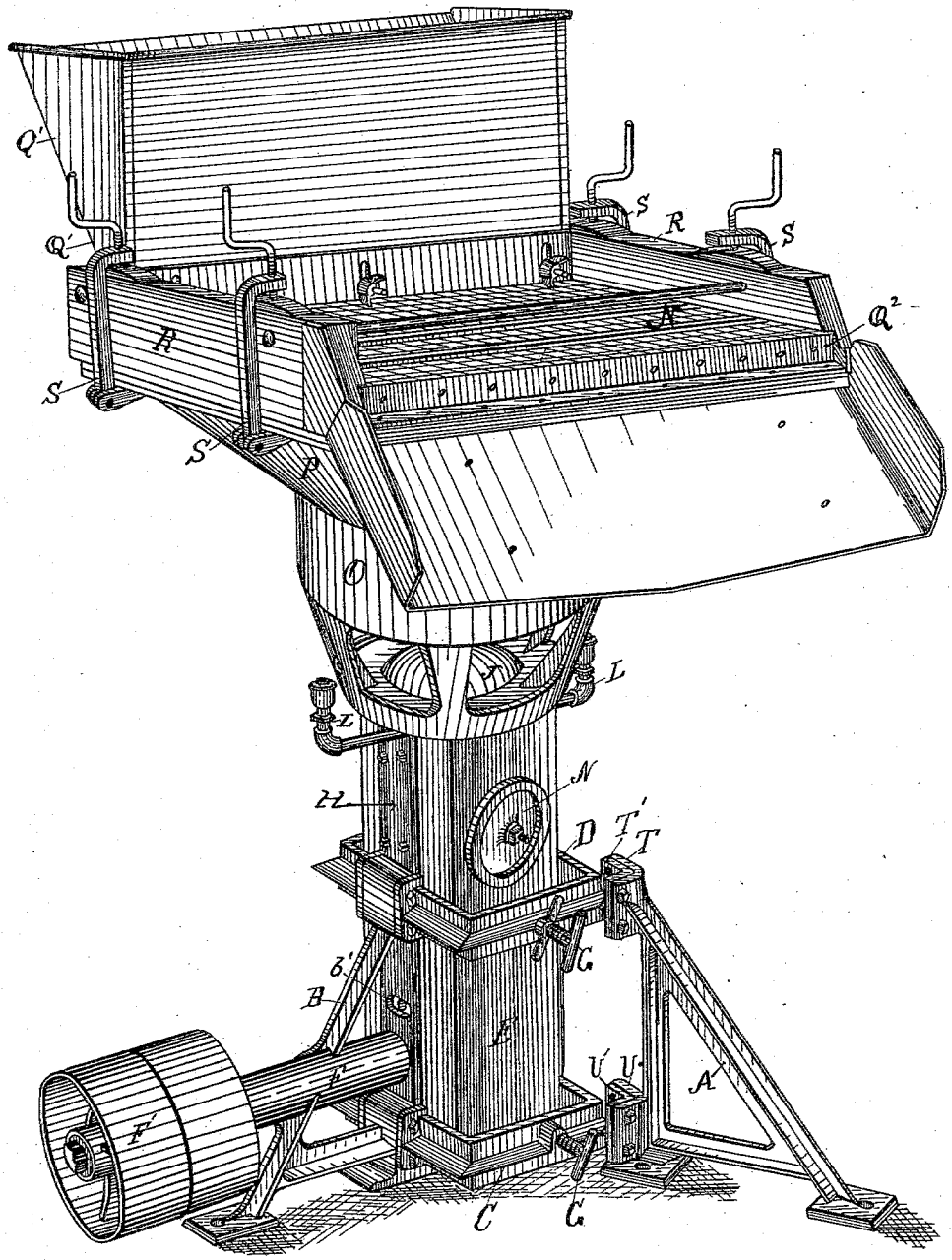
LE GRAND SKINNER.

ORE SEPARATOR AND CONCENTRATOR.

No. 302,951. Patented Aug. 5, 1884.

Fig. 1.



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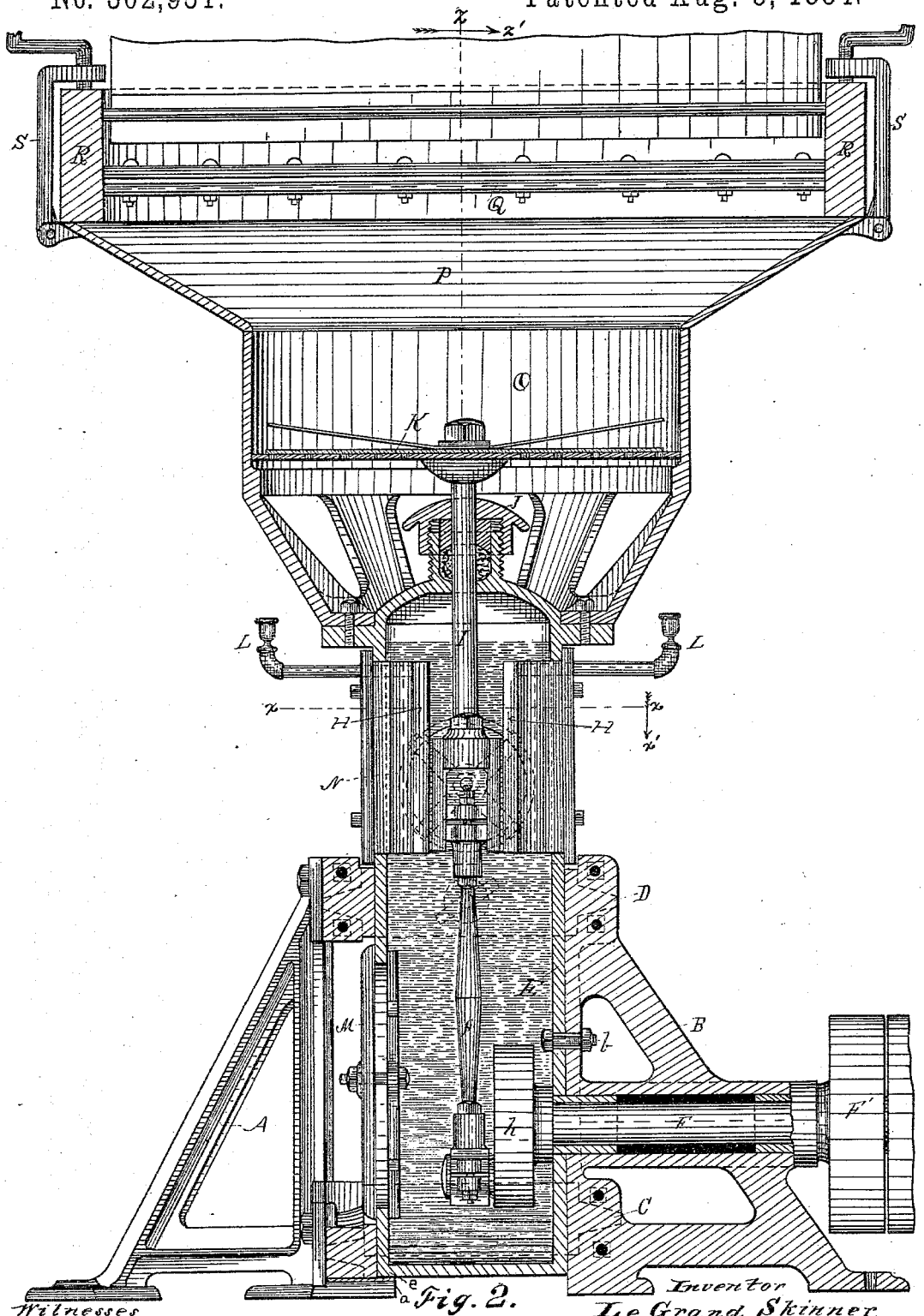

Fig. 2.

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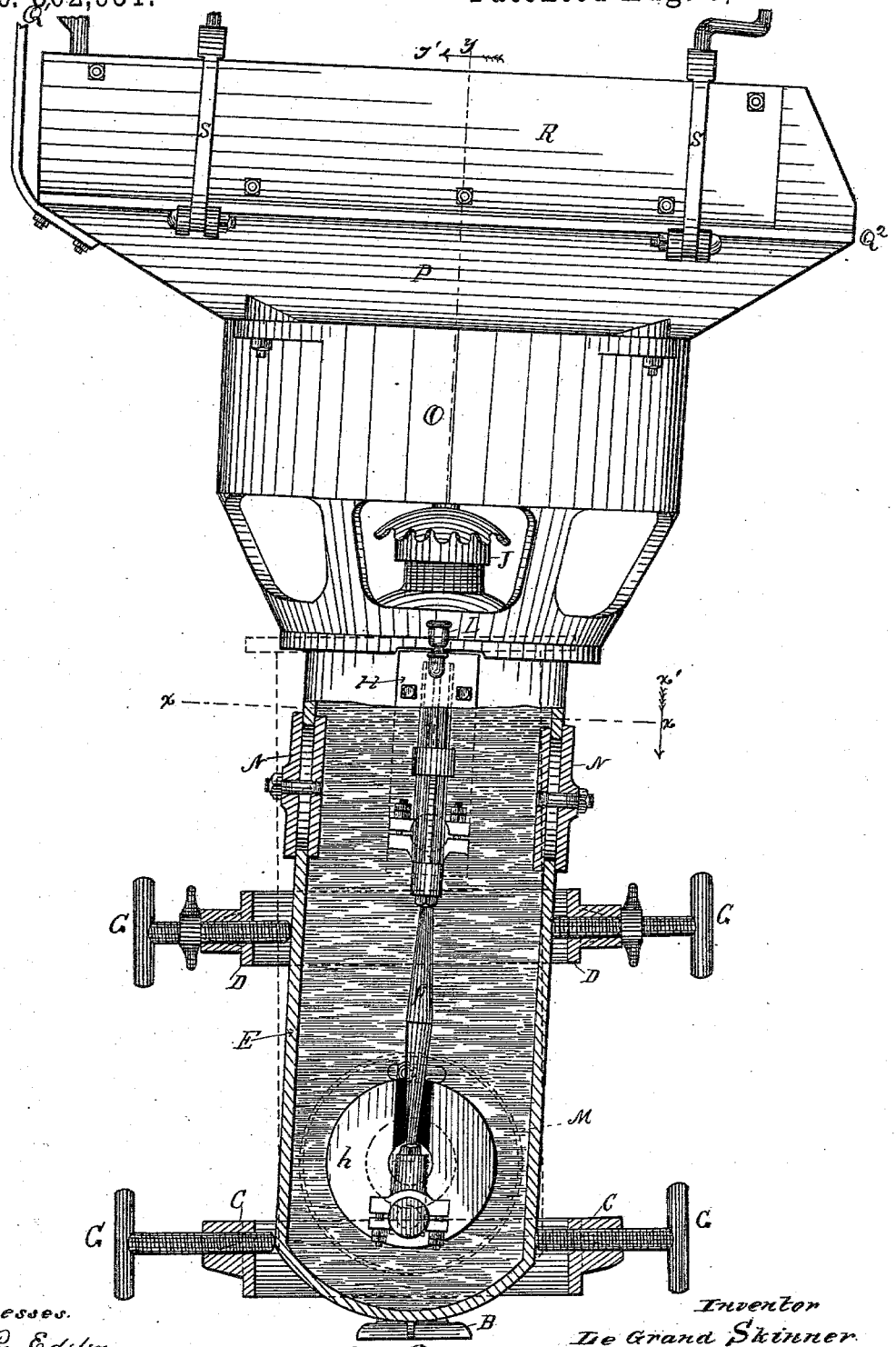

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Fig. 3.

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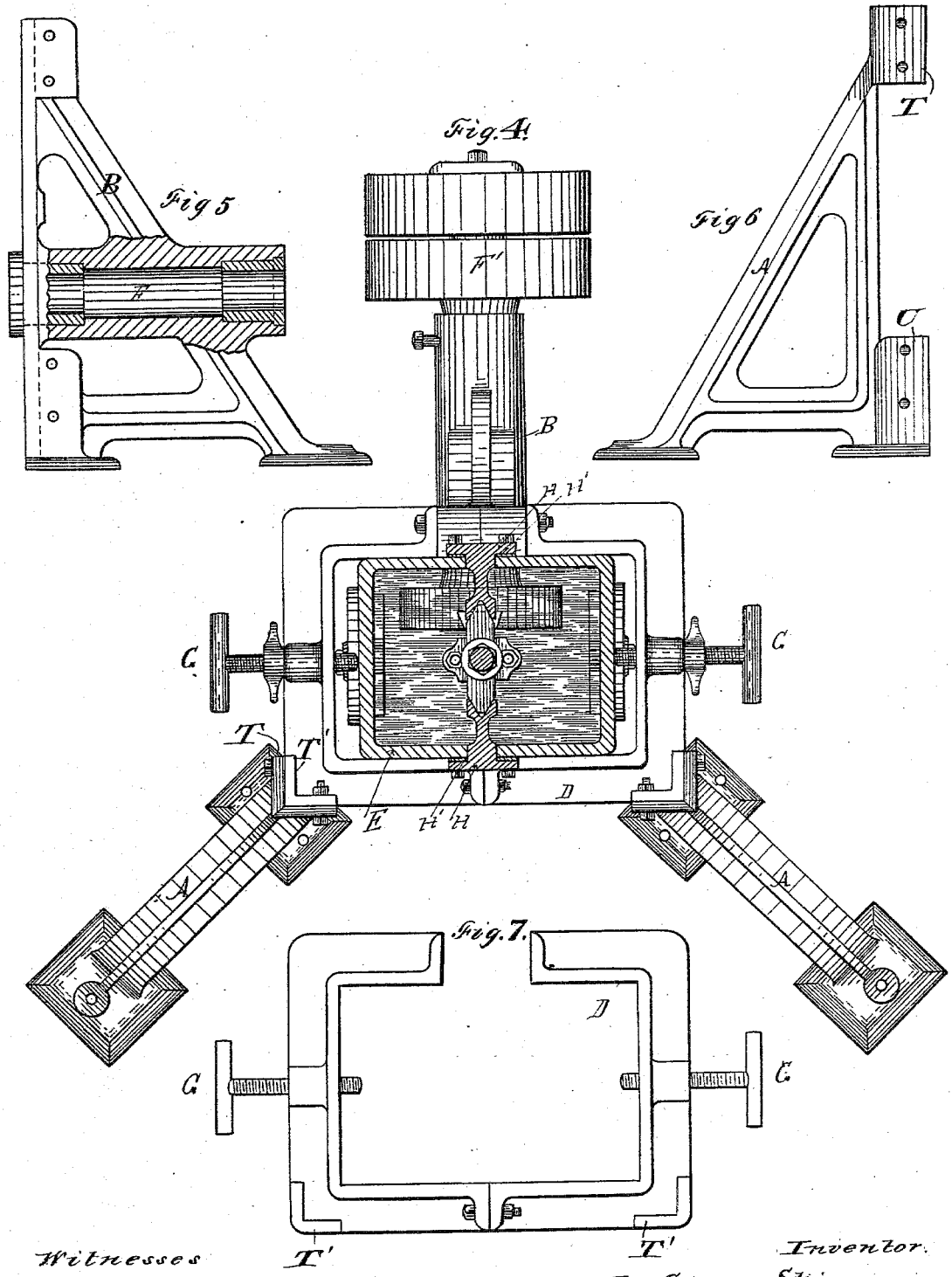

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UNITED STATES PATENT OFFICE.

LE GRAND SKINNER, OF ERIE, PENNSYLVANIA.

ORE SEPARATOR AND CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 302,951, dated August 5, 1884.

Application filed October 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, LE GRAND SKINNER, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Ore Separators and Concentrators; and I do hereby 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 letters of reference marked thereon, forming part of this specification.

My invention relates to improvements in the mechanism and construction of ore separators and concentrators, and particularly to that class known as "dry separators and concentrators."

The objects of my invention are, first, the construction of the frame of an ore-concentrating machine in two parts, the lower of which is made fixed and stationary, and the upper part journaled thereon upon a common axis with the driving-shaft of the machine, so as to permit the canting of the upper part thereof laterally without interfering with the operation of the driving mechanism of the machine; second, the construction of the frame of an ore-concentrating machine in two parts, the lower of which is fixed and stationary and supports the driving-shaft, the upper part being movable and constructed in part of a fluid-tight case inclosing portions of the operative mechanism of said machine, thereby protecting the same from the action of dust and grit; third, the construction of the parts of the frame and mechanism of an ore-concentrating machine in sections, and connecting the same together by means of bolts, so that the machine can easily be taken apart and packed in convenient packages for transportation.

I attain these objects by means of the mechanism illustrated in the accompanying drawings, which form part of this specification, in which—

Figure 1 is an elevation in perspective of my improved machine. Fig. 2 is a vertical section of my machine on the line *y* in Fig. 3. Fig. 3 shows in elevation one end of my machine, part in section, on line *z*, Fig. 2. Fig. 4 is a horizontal section of my machine on the line *x x* in Fig. 3. Fig. 5 shows in elevation one leg of the fixed frame of my machine, and also in section the bearings of the driving-shaft mounted therein. Fig. 6 shows in elevation one of the other legs of my machine. Fig. 7 shows a horizontal view of one of the sections of the fixed frame of my machine.

Similar letters refer to similar parts of my machine through the several views.

The frame-work of my machine is composed of two portions, a lower portion, which is fixed and stationary, and an upper portion, which rests upon the lower and is movable and adjustable. The lower or fixed portion of the frame is constructed in sections consisting of the inverted bracket-shaped legs A A, (one of which is shown in Fig. 6,) the leg B, (shown in Fig. 5,) and the upper and lower frames, C and D, (one of which, D, is shown in Fig. 7.)

In constructing the stationary frame of my machine, I bolt the upper ends of the legs A A to the corners of the section D of the frame diagonally opposite the opening in the side of D by means of bolts, which pass through suitable flanges, T, on the upper ends of the legs A A, and also through holes in flanges T′ on the corners of D, as illustrated in Figs. 1 and 4. The upper end of the leg B is constructed of suitable width to fit the opening in D, and is secured therein by a bolt or bolts passing through it and through flanges on each side of the opening in D, as illustrated in Figs. 1 and 4. The section C of the frame is of like shape and construction as the section D, and the inner lower angles of the legs A A are provided with suitable flanges, U, by means whereof they are secured to flanges U′, on the corners of C, diagonally opposite to the opening in the side thereof, by bolts passing through said flanges U and through holes in the flanges U′ on the corners of the section C. The leg B is secured to C by having the inner lower angle of the leg B fitted into the opening in the side of C, and secured therein by bolts passing through flanges on C and through the leg B, the leg B thus fitting the opening in the sides of the sections D and C and securing the ends thereof together, as illustrated in Fig. 1. The driving-shaft F of the machine is journaled in the leg B, (the same being shown in Figs. 1,

2, and 4,) and is provided with pulleys F', by means whereof the power to operate the machine is communicated.

Within the sections C and D (one of which is shown in Fig. 7) of the fixed frame of my machine I place the lower portion of the upper or movable frame of my machine. This I construct as a fluid-tight case, E. The case E is journaled around the axis of the driving-shaft F and upon a common center therewith, and is secured in place by a bolt, *b*, passing through one side thereof and through a slotted hole, *b'*, therefor in the leg B of the fixed frame. It is also supported by the adjusting-screws G G, &c., which pass through the parts C and D of the fixed frame, and as a further support therefor its lower end rests on the inner edge of the portion C of the fixed frame, as hereinafter described. The adjusting-screws G G, &c., pass through the opposite sides of the portions C and D of the fixed frame and press against the edges of the case E, and serve to laterally adjust the case E and that portion of the machine resting thereon for varying the horizontal plane of the ore-bed Q, hereinafter referred to. To admit of such lateral adjustment of the case E, the bolt *b* is provided with a slotted hole, *b'*, in the leg B of the fixed frame. The bottom of the case E is also made in the form of an arc of a circle having its axis on a common center with the driving-shaft F, and at the point *e* the lower end of the case E rests on the inner edge of the frame C at *a*. By means of this construction and arrangement of the parts described of my machine, the case E and the parts resting thereon, hereinafter described, can be canted or laterally inclined, as may be desired, without interfering with the tension of the driving-belt upon the pulley F'.

Within the case E is placed the crank-disk *h*, which is mounted upon the end of the shaft F, which extends through the side of and into the case E, also the connecting-rod *f*, which connects the crank-pin with the cross-head which works in the guides H H, and the piston-rod I, which extends out of the top of the case E through a stuffing-box, J, and forms the connection between the said cross-head and the piston-valve operating in the cylinder O. The guides H H are inserted into the case E through openings H' H'. These guides are provided with flanges which cover the openings H' H', and are secured in place by bolts through the sides of the case E and the flanges on the guides H H. Suitable packing is used between the flanges on the guides H H and the case E, and by varying the thickness of this packing the guides H H can easily be adjusted from the outside of the case E. Thus that portion of the mechanism of my machine consisting of the crank-disk *h*, connecting-rod *f*, guides H H, and part of the piston-rod I are inclosed in the case E, which protects these working parts from the action of the dirt, sand, or grit of any kind. This case E may, if desirable, be filled with oil and water or with any suitable lubricating-fluid through oil-cups L L, which communicate with the inside of the case E at or above the guides H H. The case E is also provided with hand-holes M and N N, which are closed by suitable covers secured in the ordinary way, these covers being adapted to be removed to adjust or repair any portion of the mechanism contained in the case E.

Near the top of the case E, and as a part thereof, is constructed a flange upon which the cylinder-frame O rests, and to which said frame is firmly bolted, as shown in Fig. 2. This cylinder-frame O is provided with a piston-valve, K, which is connected with the upper end of the piston-rod I, and is thereby operated. The lower end of the hopper-frame P is constructed so as to rest upon the upper end of the cylinder-frame O, and is secured thereto by bolts, as shown in Fig. 2.

Upon the top of the hopper-frame P is placed an ore-bed, Q, of ordinary construction, which is held in place by the ore-bed frame R R, &c. The ore-bed frame R R, &c., is secured to the top of P by means of the hinged clamp S S, &c., as shown in Figs. 1, 2, and 3.

All of the parts, being constructed and arranged as shown and described, can readily be detached from each other by removing the bolts securing them in place, when desired, for transportation or other purpose.

The construction of the ore-bed Q is not described, as there is nothing novel in its construction; also, means for feeding ore to the ore-bed, being well known and not forming any part of my invention, are not described.

In operating my machine, power is applied to the driving-shaft F, which, by means of the mechanism inclosed in the case, actuates the piston-valve K, thereby pumping air upward against the under side of the ore-bed Q in rapidly intermittent blasts, thereby producing a rapid vibration of the ore-bed Q, so that when arranged in position, as shown in Figs. 1 and 3, with the ore-bed discharge Q^2 slightly lower than the opposite end of the ore-bed Q, and ore mixed with sand and other impurities is fed upon the ore-bed at Q', the blasts of air from the piston-valve K, and the vibrations of the ore-bed Q caused thereby, separate the lighter from the heavier particles. The ore, sinking down upon the bed, is retained by cleats V thereon for that purpose, while the sand and lighter materials are discharged, by the operations of the air-blasts and the vibrations of the ore-bed, off of the ore-bed at Q^2; and when the ore-bed becomes charged with ore retained by the cleats V thereon, it is removed from its frame and cleaned and replaced, when it can be operated as before.

I am aware that machines of this class have been heretofore patented—viz., Patents No. 212,330, to Edward W. Stephens, granted

February 13, 1879, and No. 236,730, granted July 18, 1881—show mechanism producing intermittent air-blasts upon the under side of an ore-bed; and other parties have constructed ore-concentrators in which the horizontal plane of the ore-bed can be varied; therefore I do not claim the manner of operating the ore-bed by intermittent blasts of air; neither do I claim, broadly, the means for changing the horizontal plane of the ore-bed.

Having thus described my improvement, it is manifest to those skilled in the art to which this invention appertains that many parts can be changed and modified both in construction and arrangement. I do not, therefore, desire to confine myself to the exact construction and arrangement of parts shown and described, as many variations will readily suggest themselves to mechanics and others skilled in the art, which would operate well without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an ore-concentrating machine, a stationary base-frame and a driving-shaft journaled therein, in combination with a movable frame, and means for supporting and adjusting said frame on and around a common center with the axis of the driving-shaft, substantially as set forth.

2. In an ore-concentrating machine, a stationary base-frame, in combination with an adjustable frame mounted thereon, the lower section of said adjustable frame being a fluid-tight case, substantially as set forth.

3. In an ore-concentrating machine, a stationary base-frame constructed of the legs A A B and frames C D, the driving-shaft F, and the adjusting-screws G G G G, in combination with an adjustable frame comprising the fluid-tight case E, the cylinder-frame O, the hopper-frame P, and ore-bed frame R R, all constructed and operating substantially as set forth.

4. In an ore-concentrating machine, and being a portion of the frame thereof, the fluid-tight case E, provided with openings H′ H′, in combination with the guides H H, extending through said openings and adjustably attached to said case E, substantially as set forth.

5. In an ore-concentrating machine, a stationary base-frame constructed of the legs A A B and frames C D, in combination with an adjustable frame adapted to be mounted on said stationary base-frame and comprising the sections E O P and R R, and removable bolts for connecting said sections together, substantially as and for the purpose set forth.

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

LE GRAND SKINNER.

Witnesses:

N. J. CLARK,

C. J. STURGEON.