

J. F. PAGETT.

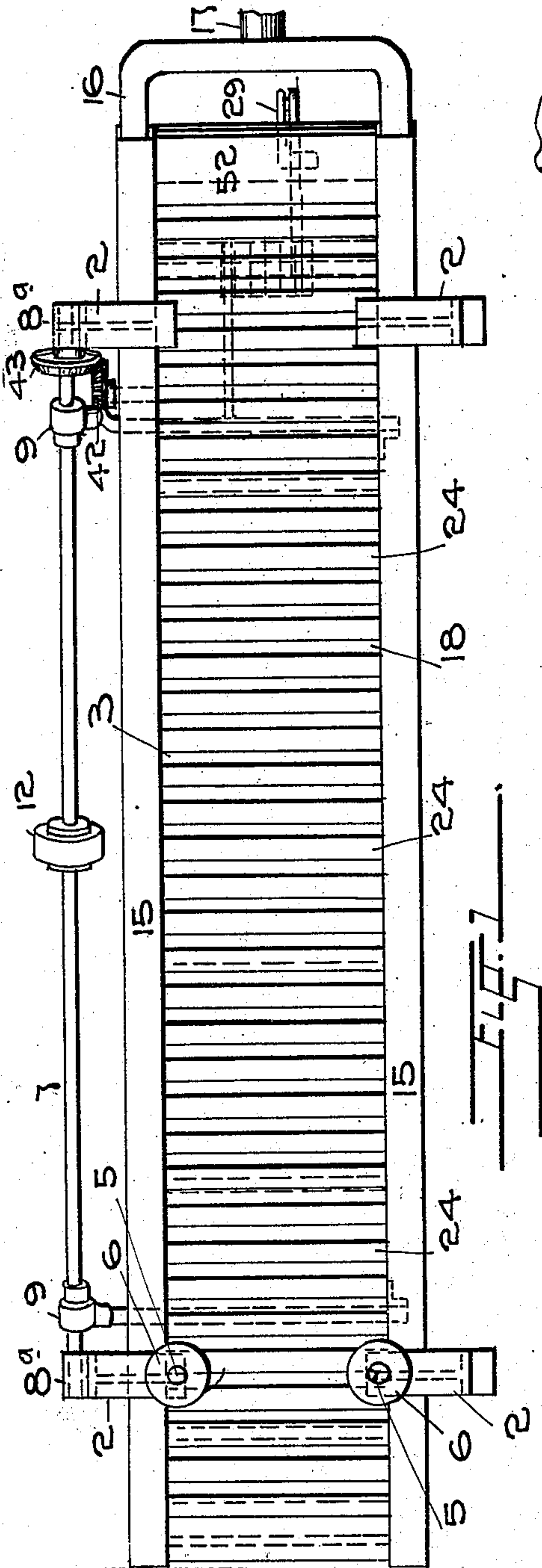
ORE SEPARATOR.

APPLICATION FILED OCT. 12, 1907.

900,581.

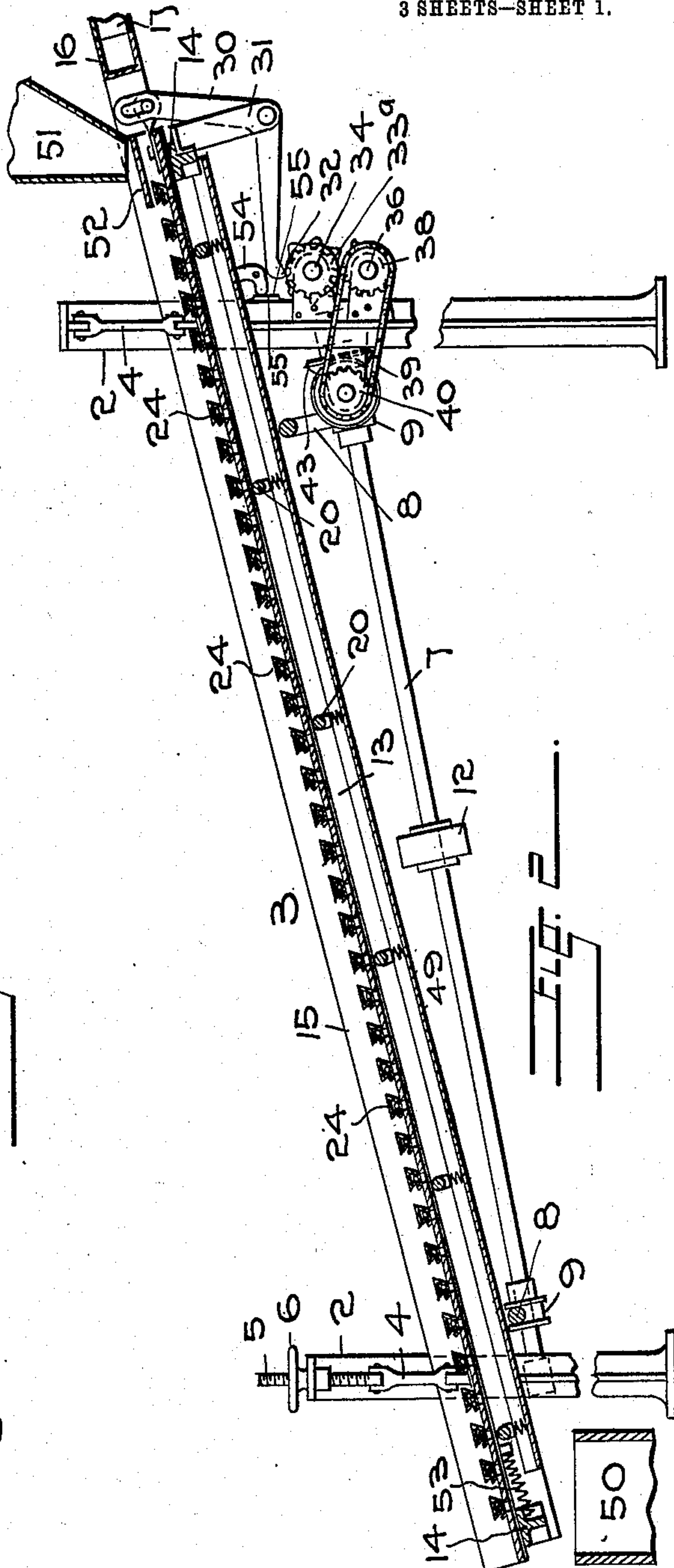
Patented Oct. 6, 1908.

3 SHEETS—SHEET 1.



WITNESSES:

Frank J. Wilson.
K. M. Stump



INVENTOR.

J. F. Pagett.

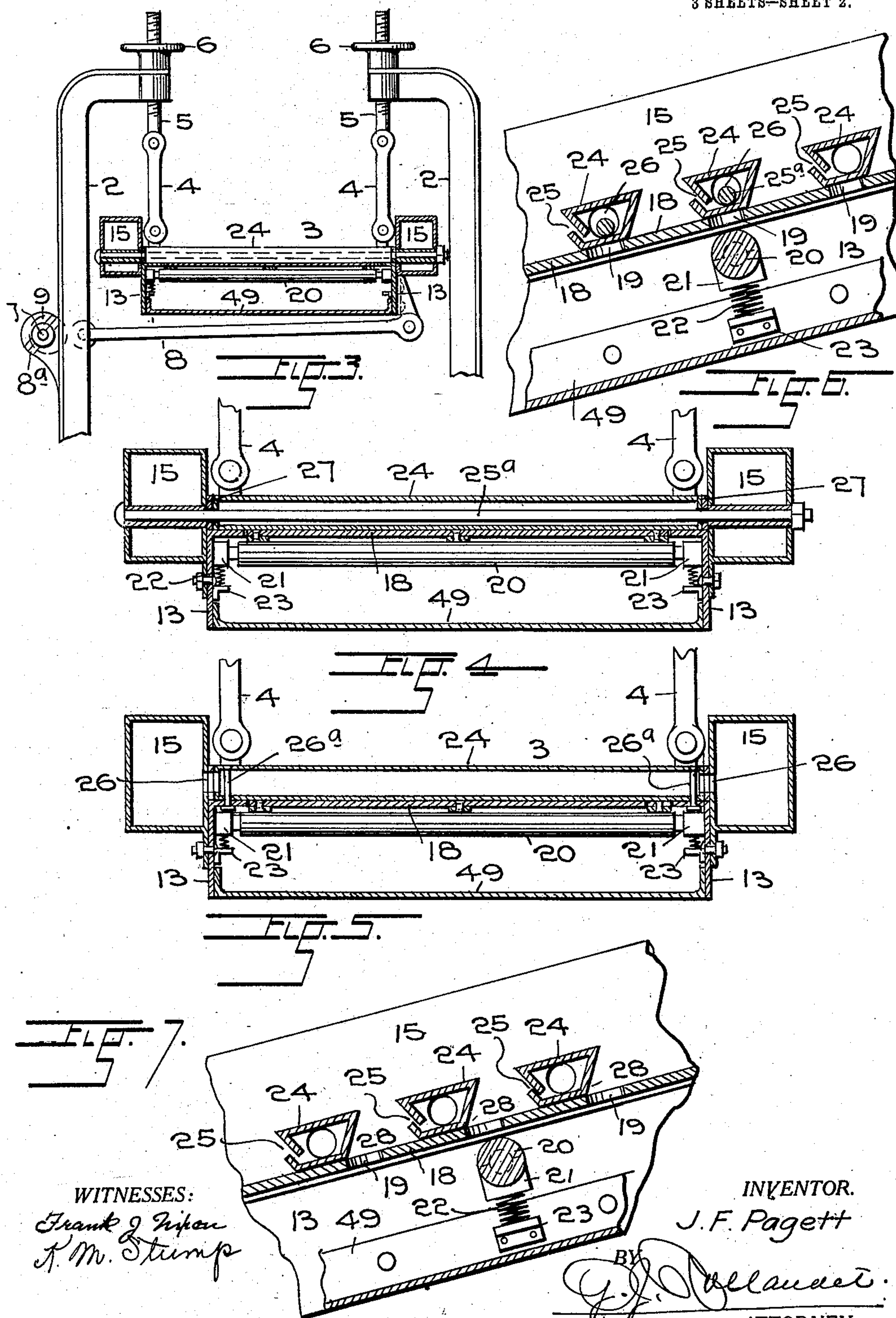
BY *J. O. Blauvelt*
ATTORNEY.

J. F. PAGETT.
ORE SEPARATOR.
APPLICATION FILED OCT. 12, 1907.

900,581.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 2.



WITNESSES:
Frank J. Nipon
A. M. Stump

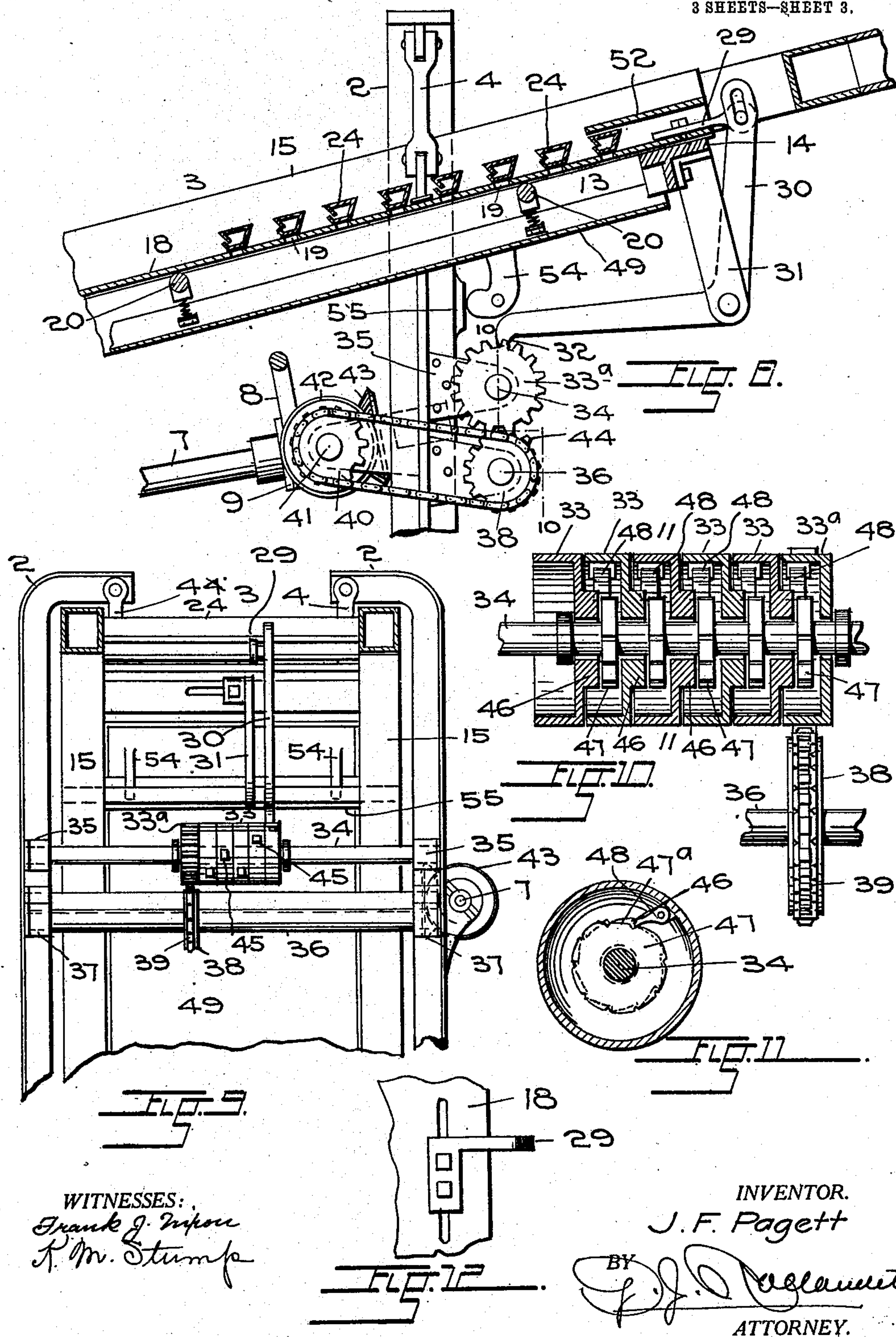
INVENTOR.
J. F. Pagett

BY
G. J. Belland
ATTORNEY.

900,581.

Patented Oct. 6, 1908.

3 SHEETS--SHEET 3.



UNITED STATES PATENT OFFICE.

JOSEPH F. PAGETT, OF DENVER, COLORADO.

ORE-SEPARATOR.

No. 900,581.

Specification of Letters Patent.

Patented Oct. 6, 1908.

Application filed October 12, 1907. Serial No. 397,173.

To all whom it may concern:

Be it known that I, JOSEPH F. PAGETT, a citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Ore-Separators, of which the following is a specification.

This invention relates to improvements in ore separators and more especially in the class of machines in which the separation of the values from the extraneous matter in pulverized ore, is effected by means of blasts of air which hold the pulverized matter in suspension for a period sufficiently long to permit the heavier and valuable particles to drop upon a subjacent surface while the lighter constituents are carried onward.

The object of my invention is to provide a device in which simplicity of construction is combined with thorough practicability in use, which may be employed with equal results to effect a clear separation of the mineral bearing matter from the gangue or pulverized rock, or to separate the auriferous or so-called black sand from the earth and gravel in placer mining, and in which the accumulated values are automatically discharged, at regular predetermined intervals, from the surface upon which they were deposited during the operation of the apparatus.

I attain these objects by the mechanism illustrated in the accompanying drawings in the various views of which like parts are similarly designated and in which

Figure 1—represents a plan view of the machine, Fig. 2—a central, longitudinal section thereof, Fig. 3—a fragmentary, transverse section, Figs. 4 and 5—enlarged cross sectional views of the shaking riffle box, Figs. 6 and 7—enlarged, fragmentary, longitudinally sectional views of the said box with the discharge plate in the closed and opened positions, Fig. 8, a fragmentary sectional view of the rear portion of the device showing the means employed to periodically actuate the sliding discharge plate, Fig. 9—a fragmentary end elevation of the machine, Fig. 10—an enlarged fragmentary section taken along a line 10—10, Fig. 8, Fig. 11—a cross section taken along the line 11—11, Fig. 10 and Fig. 12—a fragmentary plan view of the upper end of the sliding plate.

Referring to the drawings, the reference characters 2 designate four standards which

are arranged in pairs respectively at the head and foot end of the machine, and from which the riffle box 3 is transversely movably suspended by means of thereto pivotally attached hangers 4. The hangers at the foot end of the device are connected at their upper ends with the lower extremities of adjusting screws 5 which extend loosely through vertical apertures in the respective standards 2 and are held in position thereon by means of nuts 6. This arrangement allows ready regulation of the longitudinal inclination of the box or trough 3, which may be varied in accordance with the nature of the material under treatment.

To prevent independent longitudinal movement of the box, I provide the same with stops 54 which are arranged to engage a plate 55 which connects the standards at the upper or head end of the machine. A shaft 7 rotatably mounted in boxes 8 upon two of the standards at one side of the machine, carries eccentrics 9 which are connected by means of rods 10 with the suspended element for the purpose of imparting a transverse reciprocating movement thereto. A rotary movement may be transmitted to the shaft 7 from any convenient source of power, through the instrumentality of a pulley 12.

The riffle box 3 is composed of a rectangular frame formed of two parallel longitudinally arranged angle beams 13 which are connected at their extremities by transversely disposed, parallel tee irons 14.

Rigidly secured against the outer surfaces of the beams 13 and projecting above their upper surfaces, are two air boxes or conduits 15, which extend longitudinally from the lower end of the frame to a point beyond its upper extremity where they are connected by means of a transverse flue 16 which by means of a flexible connection 17, communicates with a blower or analogous contrivance, which for obvious reasons has been omitted from the drawings. A plate 18, provided with a series of transverse, equidistantly arranged slots 19, is disposed upon the frame intermediate the upper flanges of the parallel beams 13, and is longitudinally movably supported upon a series of transverse anti-friction rollers 20 which are rotatably mounted in boxes 21 placed contiguous with the inner, vertical surfaces of the said beams. Springs 22 in engagement with the lower portion of the boxes and with subjacent

inwardly projecting stationary brackets 23 on the beams 13, are applied to maintain a contact between the upper surface of the plate 18 and the lower surfaces of a plurality of riffles 24 which being disposed transversely in between the longitudinal conduits 15, are secured to the latter by stay rods 25^a and to the beams 13 by means of bolts 26^a. The riffles 24 are hollow, trapezoidal in cross section and provided at one of their convergent sides with a longitudinally extending slot-like orifice 25 which being formed by the lapping ends of the upper and lower portions of which the said side is composed, is designed to emit air, contained in the riffles, in an upward direction. When secured in the manner hereinbefore described, the riffles cover the slots 19 in the plate 18 and communicate with the interior of the two conduits 15 by means of apertures 26 in the inner sides thereof. Washers 27 placed in between the sides of the conduits and the ends of the riffles insure an air tight connection. The riffles are arranged in relation to the other members of the device so that the sides having the orifices 25, face the lower or foot end of the machine and the narrowest ones of their parallel sides are in engagement with the upper surface of the plate 18. The riffles thus placed form with their upwardly extending, rearmost, closed sides a plurality of acute pockets 28 in which the valuable particles of the auriferous matter under treatment, accumulate, as will be described hereinafter. The upper extremity of the longitudinally slidable plate 18 has an outwardly projecting, transversely adjustable lug 29 which is pivotally connected with the slotted upper end of a bell crank lever 30. The latter is fulcrumed upon the lower end of a bracket 31 which depends from the adjacent cross beam 14 with which it is transversely adjustably connected.

The opposite or inner extremity of the bell crank lever has a downwardly ranging projection 32 which engages the circumferential surface of one of a series of wheels 33 mounted in consecutive order upon a shaft 34 which extends transversely of the adjacent standards 2 and is rotatably supported thereon in boxes 35. A second shaft 36, mounted in boxes 37, in parallel relation to and below the first named shaft 35, carries a sprocket wheel 38 which by means of a chain 39 is operatively connected with a corresponding wheel 40 upon a third, transversely disposed shaft 41 which receives a rotary movement from the line shaft 7 through instrumentality of a set of meshing bevel gear wheels 42 and 43. The first one of the series of wheels upon the shaft 34, which in the drawings is designated by the reference numeral 33^a, has a plurality of peripheral, equidistant cogs and the chain 39 is provided with a detent 44 adapted to engage the said

cogs and to thus cause a partial revolution of the wheel 33^a. The other, successively arranged wheels 33 are each provided with one peripheral cog 45 and with an integral ratchet wheel 46 which when the wheels are assembled upon the shaft, extends into the interior of the preceding wheel and in close proximity to a notched wheel 47 fixed upon the shaft 34. The last named wheel whose diameter is equal to that of the ratchet wheel has a peripheral depression 47^a which permits a pawl or dog 48 pivoted within the adjoining wheel 33 and which extends over both the wheels 46 and 47, to engage the teeth of the ratchet wheel, once during each revolution of the wheel to which it is attached.

Each time the chain 37 travels a distance equal to its length, the detent 44 engages a tooth of the wheel 33^a and causes the latter to revolve a distance equal to the distance between two successive teeth. When the wheel 33^a has completed one revolution, the pawl mounted in the adjoining wheel 33 engages, as hereinabove explained, the ratchet of the first named wheel with the result that the said adjoining wheel is advanced a distance equal to the length of one of the interdental spaces of the ratchet wheel and when the second wheel has completed its revolution a partial rotation is, in a similar manner imparted to the third wheel, which in its turn intermittently actuates the fourth wheel and so on to the last wheel which, when the parts are in the relative positions shown in the drawings, engages the extremity of the bell crank lever. During each revolution of this last wheel of the series, the cog upon its periphery engaging the projection 32 on the bell crank, causes the latter to turn about its axis with the result that the slotted extremity of its upwardly ranging arm, moving rearwardly, draws the sliding plate 18 in the same direction. The upward, longitudinal movement of the plate 18 brings the openings 19 which normally are covered by the riffles 24, to a position below the acute pockets 28, as illustrated in Fig. 7, with the result that the therein accumulated matter is free to discharge into a discharge trough 49, which is secured to the lowermost portions of the angle beams 13 and which conveys the said matter into a subjacent receptacle 50. The moment the projection 45 upon the wheel 33 is disengaged from the extremity of the bell crank lever by further rotative movement of the said wheel, a spring 53 applied at the foot end of the plate 18, returns the latter to its original position.

It will be manifest that the number of movements of the plate 18 during a certain period, may be varied by moving the bracket 31 and the lug 29 together with the there-with connected bell crank 30, transversely

so as to bring the latter in engagement with any one of the different wheels 33, whose revolutions decrease in number in ratio to their progressional position in relation to the wheel 33^a.

Having thus described the mechanical construction of the apparatus, its operation will be readily understood. The pulverized ores, or in case the device is used in placer mining the sand and gravel, are fed from the hopper 51 at the head end of the machine, upon an apron 52 from where it drops into the space intermediate the upper two riffles and in the path of the current of air which being conducted from the blower into the riffles by means of the flues 15, 16 and 17, is emitted therefrom in an upward direction through the orifices 25. The heaviest particles of the metallic constituents of the ore or sand fall by reason of their proportionately greater specific gravity, upon the plate 18 and against the adjacent riffle 24 while the lighter matter is carried onward to the space intermediate the next two riffles where it is subjected to the influence of a second current of air with the result that the heaviest particles contained in the residual matter drop into the subjacent pocket 28. This action is repeated until the lowermost riffle at the foot end of the device is reached at which point the worthless matter or gangue is permitted to drop over the edge of the box. The transverse vibratory movement of the riffle box greatly aids in the even distribution of the matter discharged from the hopper and in the separation of its constituents in ratio to their proportionate specific gravity, while the downward movement of the ore may be regulated in accordance with its nature, by adjustment of the longitudinal inclination of the box.

The valuable matter accumulating behind the riffles 24, is automatically discharged at predetermined intervals, by means of the mechanism hereinbefore described and the length of the said intervals may readily be regulated in accordance with the character of the ore or other matter under treatment.

It will be observed that by reason of the outflow of air from the riffles occurring a certain distance above the surface of the plate 18, the values in the pockets 28, remain undisturbed after having been deposited therein.

Having thus described my invention what I claim is:—

1. In an ore separator, an inclined plate, a plurality of transverse hollow riffles thereon and means to conduct air into the said riffles from a suitable source, the said riffles having air outlets in one of their sides.

2. In an ore separator, an inclined trough including longitudinally disposed air flues, and a plurality of transverse hollow riffles upon the

plate connected with the said flues, the said riffles having air outlets in one of their sides.

3. In an ore separator, a member having an inclined surface, a plurality of transverse hollow riffles thereon and means to conduct air into the latter, the said riffles having downwardly converging sides and a longitudinal orifice in one of the latter.

4. In an ore separator, a member having an inclined surface, a plurality of transverse hollow riffles thereon and means to conduct air into the latter, the said riffles having downwardly converging sides, and an upwardly ranging orifice in one of them.

5. In an ore separator, a member having an inclined surface, a plurality of transverse hollow riffles thereon and means to conduct air into the latter, the said riffles having downwardly converging sides, one of which is composed of an upper portion and an overlapping portion spaced therefrom.

6. In an ore separator, a movable, apertured element, a plurality of riffles held in superposed relation thereto and normally covering the apertures therein, and means to adjust the position of the said element in relation to the said riffles so as to uncover the said apertures.

7. In an ore separator, a movable, apertured element, a plurality of riffles held in superposed relation thereto and normally covering the apertures therein, and means to automatically adjust at predetermined intervals, the position of the said element in relation to the said riffles so as to uncover the said apertures.

8. In an ore separator, a movable, apertured element, a plurality of riffles held in superposed relation thereto and normally covering the apertures therein, means to adjust at predetermined intervals, the position of the said element in relation to the said riffles so as to uncover the said apertures, and means to regulate the length of the said intervals.

9. In an ore separator, a frame, parallel air flues thereon, a plurality of hollow riffles having an orifice in one of their sides and connected with the said flues, a movable apertured plate subjacent the said riffles, its apertures being normally covered thereby and means to adjust the position of the said plate in relation to the said riffles so as to uncover the said apertures.

10. In an ore separator, a transversely movable frame, parallel air flues thereon, a plurality of hollow riffles having an orifice in one of their sides and connected with the said flues, a movable apertured plate subjacent the said riffles, its apertures being normally covered thereby, means to adjust the position of the said plate in relation to the said riffles so as to uncover the said apertures and means to impart a transverse reciprocatory movement to the said frame.

11. In an ore separator, a longitudinally inclined, movable frame, parallel air flues thereon, a plurality of hollow riffles having an orifice in one of their sides and connected
5 with the said flues, a movable apertured plate subjacent the said riffles, its apertures being normally covered thereby, means to adjust the position of the said plate in relation to the said riffles so as to uncover the
said apertures, means to impart a recipro- 10
catory movement to the said frame, and
means to adjust the inclination of the frame.
In testimony whereof I have affixed my
signature in presence of two witnesses.
JOSEPH F. PAGETT.

Witnesses:

G. J. ROLLANDET,
R. M. STUMP.